RAILROAD GAZETTE

SATURDAY, SEPTEMBER 27, 1873.

European Passenger Traffic.

About the year 1870, Mr. H. Schwabe, Chief Engineer, Royal Counsellor and member of the board of directors of the Lower Silesian Railroad, visited England and Scotland and published a record of his observations on the working of the English railroads in a volume entitled "On the English Railroad System," which contains many matters of interest to railroad men everywhere, which have been increased in a French translation, made by Belgian railroad officers, by their comparisons with Belgian railroads. In our translation of the following chapter on passenger traffic we have made use of the German original and the French translation, by the latter getting the use of the Belgian notes, which are especially valuable as affording information of the traffic in the most densely peopled civilized nation, where traffic is probably more fully developed than elsewhere on the globe:

CLASSES.

In England passenger trains are usually composed of three classes of coaches. Fourth-class cars are only used exceptionally on few railroads and for short trips only (for example, on the London & Northwestern for carrying the people of the island of Anglesea to Bangor and Holyhead on market days, and over the Caledonia Railway's line from Glasgow to Greenock).

The different classes of coaches are differently combined in the trains. Trains composed exclusively of first-class coaches are used only on a few lines extending toward the southern coast. Such is, on the Southeastern, the mail train from London to Dover, and on the London, Brighton & South Coast, the Brighton express. Upon the greater part of the English lines, trains are composed of first and second class, and, on a few, of third-class coaches. The latter are used principally on the North London.* For a few years past, more attention has been paid to the means of increasing third-class traffic. This tendency is the result of the the impulse which Parliament has given by establishing what are called "parliamentary trains," composed of the three classes and stopping at all stations.

FARES.

The passenger tariffs present very great variations, arising either from the competition of adjoining lines of railroads or steamboats, or from local considerations. Comparing with each other the rates per mile on all the great lines of England and Scotland, no general principle can be discovered, unless it is that of proportioning the tariffs to the importance of the traffic. The railroads which extend from London toward the south have, in fact, the heaviest passenger traffic and are those which impose the highest prices, while the railroads leading toward Scotland have lighter tariffs, and in Scotland itself the tariffs are reduced to their minimum. A more thorough examination of the passenger tariffs on the English lines leads to the following results:

1. EXPRESS TRAINS.

The railroads terminating at London, Southeastern; London, Brighton & South Coast; London, Chatham & Dover; London & Southwestern; Great Eastern, are the only ones which exact higher rates on express trains:

First class.....5.4 to 5.7 cents per mile
Second class.....3.9 to 4.5 " "

But these rates undergo important variations. Thus, on the London & Chatham line, only 4.2 cents is charged for first class and 3.3 cents for second class. On the London & Yarmouth line of the Great Eastern, the rate of 6 cents per mile charged on the first 28 miles falls to 4.8 cents at 144 miles' distance.

The highest rates are those of the Southeastern, on the lines from London to Dover and from London to Hastings. They are 6.3 cents per mile.

The other railroads generally make no difference between the price by express and that by ordinary trains.

2. FAST TRAINS, ORDINARY TRAINS AND "PARLIAMENTARY TRAINS."

The rates per mile are:

First Class.

1. Lines leading from London southward..4.5 to 5.1 cents per mile.
2. Northern lines.....4.2 to 4.5 " " "
3. Scottish lines.....2.7 to 3.9 " " "

Second Class.

1. Lines leading from London southward..3.6 to 3.9 cents per mile.
2. Northern lines.....3.0 to 3.6 " " "
3. Scottish lines.....2.1 to 3.6 " " "

Third Class.

1.2 to 2.4 cents, generally.....1.95 cents per mile.

Fourth Class.

On the Glasgow & Greenock line of the Caledonian Railway (the passengers stand).....0.3 cent per mile.

The North London and the Metropolitan railways are, however, an exception.

The first, one of the roads which has cost most to construct, is situated in the very interior of London and its suburbs, and it has only a so-called "omnibus traffic" over the 14 miles which separate the Broad street terminus (within the city) and Richmond, its most distant station; its tariff, which decreases rapidly with the distance, is, per mile:

First class.....1.8 to 4.8 cents.
Second class.....1.8 to 3.3 cents.
Third class.....1.8 to 2.4 cents.

The tariffs of the Metropolitan are similar:

First class.....2.7 to 5.1 cents.
Second class.....2.1 to 3.3 cents.
Third class.....1.5 to 2.4 cents.†

*For about a year, most English railroads have run third class coaches on all or nearly all passenger trains.—AMERICAN TRANSLATOR.

† It seems to us interesting to compare with these figures those which govern the price of the transportation of passengers on the Belgian State lines.

The laws of 1851 and 1854 had fixed at 2.4, 1.8 and 1.2 cents per mile the rates of the tariffs for first, second and third-class passengers, with an increase of 25 per cent. in the price for express trains; the latter, moreover, could only be composed of coaches of the two higher classes. In 1865, a law gave the government the power of modifying the tariffs, by way of trial and in a temporary manner. The government was not slow to use the power which had been given it, and, on the 20th of March, 1866, it fixed the following scale, applicable to the transportation of passengers:

	1st class.	2d class.	3d class
From 3.1 to 31 miles (1 to 10 leagues) per mile	1.8 cts.	1 2 cts.	0.9 cts
From 34.1 to 62 miles (added to the price of 31.1 miles) per mile	0.9	0.6	0.45
Above 65 miles (added to the price of 62 miles) per mile	0.6	0.45	0.3

with an increase of 20 per cent. on the above prices for express trains.

This tariff, on a differential basis, was fully applied only in the zone which extends further than 50 miles. A transition scale regulated the price of transportation in the intermediate zone, and the prices fixed by the laws of 1851 and 1854 were maintained provisionally for distances less than 24 miles. At the same time third-class passengers, which hitherto had been excluded from the benefit of higher speeds, were introduced upon express trains.

The calamitous year of 1866 and the year 1867, when an exceptional movement was produced on account of the Paris Universal Exposition, could not serve as basis for a full appreciation. We scarcely began to form an exact idea of the results obtained when, in 1871 the government, by a new decree, raised the passenger tariffs and adjusted them to the following proportional basis:

First class.....2.16 cents per mile
Second class.....1.62 " " "
Third class.....1.08 " " "

With an increase of 25 per cent. for express trains.

The Government at the same time introduced "round-trip" tickets, with a reduction of 20 per cent. for the entire journey, good for one or two days, according to the distance, as also season tickets, good for three, six and twelve months, for any distance and on all trains.

The authors of the reform of 1866 have been much reproached for having established an anti-economic principle in adopting a differential basis for passenger rates, a principle which, it is said, was no where applied and was as contrary to distributive justice as to the interest of those working the railroads. Those who study these questions know what is the injustice complained of in differential tariffs—that is, tariff rates decreasing with the distance; as to the practical side, it is quite curious to find that this principle is applied among the English, *the practical nation par excellence*. We have seen, in fact, in the text, that the Metropolitan and the North London have rates which are largely differential, and that the same is true of the Great Eastern on the London & Yarmouth line.

* Galt gives, in his "Railway Reform," the following precept: "As a general rule, the worst-paying companies charge the most."

† See note further on concerning the establishment of workmen's trains in Belgium.

‡On this line about 3,000 workmen are carried daily.

The maximum rates correspond to the shortest distance, and the minimum rates to the greatest (about 6 miles).

These two railroads, which, notwithstanding their high cost of construction have lower tariffs than the majority of English railroads, demonstrate that the rate of the tariff is not always in proportion to the cost of construction. It is thus that the Great Eastern, which has very high rates, is not one of the lines whose cost has been greatest, just as lines with the highest rates are not always the most remunerative. They are even, according to Galt,* those which earn the least.

Workmen's trains† take the place of fourth-class trains, which, as we have said, are little known in England. These trains were established some years ago at the instigation of Parliament. An association (the "Metropolitan Association for Procuring Cheap and Regular Railway Accommodation for the Working Classes") was founded for the purpose of extending their application.

These trains were first established on the lines terminating in London. They are sometimes special trains, sometimes trains designated particularly for carrying workmen between 5 and 7 o'clock in the morning. An example of the first case is given us by the Southeastern: every morning, except Sundays, a train leaves Plumstead, near Woolwich, at 5 o'clock, along the southern bank of the Thames, and arrives at Charing Cross at 5:55, after having stopped at all intermediate stations. The second case is presented on the North London Railway, on which four trains daily are designated for the transportation of workmen.

The return is authorized by all trains after four or six o'clock in the afternoon, and Saturday after two o'clock.

The tickets for these trains are issued, partly as round-trip tickets, good for one day, as on the

Southeastern at the price of.....7.8 cents.
Metropolitan Extension of London, Chatham & Dover....3.7 cents.

partly as weekly commutation tickets, as on the

North London, at.....23.25 cents.
London, Chatham & Dover, at.....46.5 cents.

For the single trip the rates charged per mile are then as follows:

1. Metropolitan Extension of the London, Chatham & Dover:
   From Victoria to Ludgate Hill (6 miles) ....0.3 cent per mile.
2. Southeastern:
   From Plumstead to Charing Cross (11 miles)..0.34 cent per mile.
3. London, Brighton & South Coast:
   From London Bridge to Norwood Junction (8 miles)..0.48 cent per mile.
4. London, Chatham & Dover:
   From Penge to Sydenham Hill, Dulwich and Herne Hill, (3¼ miles).....0.684 cent per mile.
5. North London:
   From Dalston Junction to Shoreditch (1⅞ miles) 1.05 cents per mile.

The tickets, which are of the same price for the journey or for a part of it, and give the right to the free transportation of 30 pounds of baggage (tools), are issued only to mechanics and day laborers, who are required to give their christian and surname, their residence, their occupation, and the name of their employer, in order as much as possible to prevent abuses—a precaution all the more justifiable because hitherto these workmen's trains on the Southeastern and the London, Chatham & Dover‡ have given no favorable results in a financial point of view.

The above review of the customary passenger tariffs on the English railroads at this time (1870) indicates unmistakably extraordinary differences and very high rates.

We have indicated heretofore the general causes which have occasioned these extraordinary differences and which will continue them. They are the competition with other railroads and with steamboats, and, in London, with the omnibuses.

A further cause of this diversity is the entirely different relation of the passenger receipts to freight earnings in England from that on the continent.

On the Prussian railroads the receipts were in 1867:

Passengers.....$13,660,348
Freight.....34,151,822

or nearly in the proportion of 20 to 48.

During the same year on the English railroads (not including the Scottish lines) the receipts were:

Passengers.....$70,717,812
Freight.....80,354,731

or nearly in the proportion of 20 to 23.

This relation becomes still more striking by a comparison of certain roads. So, take, for example, the Berlin-Potsdam-Magdeburg Railroad, which among Prussian railroads had the greatest amount of passenger traffic in 1867:

1. Receipts from passenger transportation.....$731,619
2. Receipts from freight transportation.....991,623

On the Southeastern, which among English railroads has likewise the heaviest passenger traffic, the receipts were in 1867:

Passengers.....$4,288,248
Freight.....1,488,489

The proportion of the passenger receipts to the freight receipts is therefore 3 to 4 on the first road, and 3 to 1 on the second.

The greater influence of competition, as well as the much greater importance of the passenger traffic, are the natural causes why a uniformity of tariffs like that in Germany cannot be introduced on the English railroads, although recently various efforts have been made for a greater uniformity and a reduction in the passenger tariff.*

When we remember that on the Liverpool & Manchester Railway, opened in 1830, the fare in a covered coach with upholstered seats was 5.4 cents per mile, and in an open car with wooden benches 3.9 cents per mile,† and that now, after the expiration of forty years, the same rates are charged on a great number of lines, it would be difficult to reconcile this unchangeableness with the technical progress of railroads and with the development of railroad traffic, were it not for other arrangements which modify essentially the effects of the high tariffs. These are: the general use of round-trip tickets, commutation tickets, and various other facilities and privileges to passengers, which we will treat more in detail below.

Round-trip tickets‡ are issued for all trains except parliamentary trains, on certain days, such as Sundays or other special occasions, at the price sometimes of a single fare, but generally at 1½ the ordinary price, and "tourists' tickets" at 1½ the price of a single journey. The return tickets are good, according to the distances, for a number of days determined according to the following scale, adopted on several railroads (Sundays not included):

Up to 46 miles.....1 day.
From 46 to 116 miles.....2 days.
" 116 to 186 " .....3 "
" 186 to 279 " .....4 "
" 279 to 372 " .....5 "

On other lines round trip tickets for great distances are good for a week at all times of year, and in summer for a month.

The traveler also enjoys the privilege of breaking his journey at the principal stations, as with ordinary single tickets on the main lines.§

Besides this general use, round-trip tickets are issued in many other cases. For example, in summer season chiefly, by excursion and pleasure trains round-trip tickets are sold for the price of a single regular fare; and so of pleasure or picnic parties of a least six persons, of "tickets in lots," when one buys as much as twenty-three dollars' worth of tickets at once, issued for journeys to school, to market, etc.‖

* William Galt, "Railway Reform," and John Imray, "British Railways."

† Henr, "The Liverpool & Manchester Railway."

‡We said above that, since 1871, the Belgian Government has adopted the use of round-trip tickets, with a reduction of 20 per cent. on the price for the total distance. These tickets are good for one day when the distance does not exceed 62 miles. For greater distances they are good for two days, reckoned from midnight to midnight.

Let us remark that this system of tickets is perfectly justifiable, since it was established by a company for the purpose of making sure of the return journey, which might have been made by a competing line, but that there is less occasion for it in the existing circumstances of the Belgian State lines.

It establishes in fact, the *differential* principle, which, as we have seen, has been rejected in fixing the simple tariffs, and has the singular effect of affording to him who travels a certain distance, going and returning, a reduction in price which is refused to him who travels the same distance in one direction.—THE BELGIAN TRANSLATOR.

§A privilege which exists everywhere in England and Germany, and deserves to be introduced into Belgium.—THE BELGIAN TRANSLATOR.

‖ The laws of 1851 and 1854 had sanctioned in Belgium the existence of special tariffs, which were maintained by the decree of 1866, and even extended after that date. Now, troops traveling in corps or by detachments, societies, children of less than eight years, emigrants, prisoners and their keepers, voters going to the legislative elections, enjoy a reduction of 50 per cent on the ordinary rate.

Commutation rates for attending schools and special workmen's trains were established in 1868 and 1869.

Commutation tickets for attending schools are issued without distinguishing between private and public institutions. They are good only for ordinary trains, for the period and the days indicated. For four to six trips per week (going and returning), the tariffs are regulated according to the following scale:

YEARLY PRICE.

	Second Class.	Third Class
3.1 miles	$10 05	$6 70
6.2 "	16 75	11 16
9.3 "	23 44	15 62
12.4 "	28 46	18 97
15.5 "	35 16	23 43
18.6 "	41 85	27 95
21.7 "	46 87	31 25
24 8 "	53 57	35 71
27.9 "	58 60	39 06
31.0 "	65 30	43 52
34.1 "	72 00	47 99
37.2 "	77 02	51 34

This represents a rate per mile varying from 0.51 to 0.33 cent per mile for second-class and from 0.33 to 0.21 cent per mile for third-class fares, according to the distance.

These prices are reduced by one-third when but two or three trips are authorized per week, and by two-thirds when but one trip is made.

Workmen's trains are established on the request of leading manufacturers, under guarantee of a sufficient number of subscriptions,

Finally round-trip tickets permit returning by another line, when there are two or more railroads between the termini of the journey.

The use of "tourists' tickets" is quite as extended as that of round-trip tickets. Besides the reduction in the prices, the latter offer this further advantage, that, after having been good for a month, their duration can be extended by paying 10 per cent. of their value for the first two weeks and 5 per cent. for each additional week."

The railroads make great efforts to extend the use of season tickets, and have obtained great results, by reducing to one week the time of the ticket and lowering the tariff materially. This system has a peculiar interest for Germany, where season tickets still offer too few advantages, and will hardly come into greater use if the present rates are maintained. We have compared below the season tariffs of some of the most traveled in the vicinity, as also the extremely low tariffs of the Caledonian Railway. These tickets receive a further reduction for families, through which, by the purchase of as many as two tickets, a decrease of 5 per cent. is secured; three tickets, 7½ per cent.; four tickets, 10 per cent.; and on the Caledonian Railway every holder of a season ticket can purchase season tickets for the women of his family at one-third of the ordinary price. The Great Eastern has introduced a peculiar system by the issue of "traders' tickets"—commutation tickets for business men—by which it gives on the prices of the current year's season tickets considerable reductions, according to the sums paid to railroad company for freight during the preceding year. The price of these season tickets, good for one year, is fixed as follows:

When payments to the company the preceding year amounted to	£5 000.		£10,000.		£20,000.	
	1st class.	2d class.	1st class.	2d class.	1st class.	2d class.
Yearly ticket costs:						
For 10 miles of road...	£81.37½	£57.20	£58.08	£40.69	£46.50	£32.55
" 30 " " ...	102.30	81.37½	73.24	48.72	58.08	46.50
" 50 " " ...	122.06	97.65	87.19	69.75	69.75	55.80
" 100 " " ...	211.58	170.89	151.12	122.06	121.27	97.65

A comparison of the foregoing passenger rates with the ordinary charges on the German, and especially on the Prussian, railroads shows that the latter are materially lower, and generally only about two-thirds of the English tariffs, and this comparison is still more favorable to the German roads if the great comfort and elegance of the German passenger coaches is taken into account. The German tariffs are as follows:†

ON EXPRESS AND FAST TRAINS.
(*Courier-und schnell Zuge.*)

First class	3.75 cents per mile.
Second class	2.4 " " "
Third class	1.8 " " "

ON ORDINARY TRAINS.

First class	3.0 to 3.3 cents per mile.
Second class	2.1 to 2.25 " " "
Third class	1.2 to 1.5 " " "
Fourth class	0.75 " " "

However, to be just, we should not overlook two circumstances which have an influence on the high rates of the English passenger tariffs. These are, the tax on railroads and the damages for accidents to passengers. The tax on the railroads —"railway passenger tax"—which produced in the fiscal year 1867–68 $2,260,597.50—amounting to 3 per cent. of the gross receipts from passenger traffic—is assessed on all railroads, with the exception of the Irish lines, at the rate of 5 per cent. of the receipts from first and second-class passengers.‡

Concerning the damages paid for passengers killed or injured by accidents (which are more frequent on the English railroads than in Germany§), the bringing of suits for damages in the civil courts has led to the greatest abuses on the part of the traveling public, since for the slightest injuries to passengers the most outrageous demands for damages are preferred, which, notwithstanding the important reductions in most cases, still form a heavy burden on the income of the railroads.

How great these payments for damages may be is shown, among other instances, by the collision between a freight train and a passenger train at New Cross station, near London. The damages claimed amounted to $697,500, and the sums awarded by the courts reached nearly to $209,250, while the gross receipts of the unfortunate passenger train were only $78.80.*

To avoid such impositions, and to limit to a reasonable amount the hitherto enormous sums paid for damages, the greatest part of which goes into the lawyers' hands and only the smaller part to the persons injured, it has been proposed in Parliament, on the part of the railroad companies, to limit the damages to a fixed amount for each class of cars, just as for the workmen's trains on several London railroads Parliament has already fixed the limit of damage in case of an accident to $500 per person.

In view of these high passenger fares, which are only accounted for in part by the two causes described above, it is the more surprising that the development of passenger traffic in Germany, where rates are so much lower, has been far less rapid than in England.

During the year 1868, in England, with 21,429,508 inhabitants, the railroads were used by 269,257,313 passengers (season tickets not counted), so that the number traveling by rail was thirteen times the whole population; and in thinly-peopled Scotland, with only 3,170,769 inhabitants, 23,086,850 passengers, or more than seven times the population, used the Scottish railroads; and even the Irish railroads, the country having a population of 5,557,196 inhabitants, reported 11,792,171 passengers, or double the population. Meanwhile in Prussia, with 24,089,096 inhabitants, in 1868 the number of railroad passengers was only 56,588,244, or little more than double the population.†

This comparison would indicate that the reduction of rate really is of the greatest importance, and on that account is always to be kept prominently in view, but that the desired impulse cannot be given to the development of passenger traffic by lower rates alone, and that it is especially important *to cultivate traffic for short distances, in which the great part of the English passenger traffic consists.*

The further reductions in the existing fares of passenger traffic for long distances, which the Prussian Government is credited with intending to make, will meet all expectations, especially if with these reductions there are introduced round-trip tickets for 1½ times the price of the journey one way, whose use shall be permitted on all trains and for all distances, within reasonable limitations.

For short journeys, however, for the daily journey to the city, for the creation of that traffic, demanded on so many sides, which enables the rich merchant, as well as the poor day laborer, to spend their business and working hours in the great city, and at the close of the day to return to the bosoms of their families, living far from the noise and tumult of the great city, with its unhealthful influences—for this still greater reductions in fares are necessary; for this so-called "suburban traffic" can grow only when the daily fare is not so great as the difference in rent between the city and the country residence, as, notwithstanding the high English fares, is the case so far as season tickets and workmen's trains are concerned.

As the introduction of fourth-class cars on the Prussian railroads met at first with great opposition, and it required the determined efforts of the government, supported by the unexpectedly favorable results of the introduction of this class, to overcome the prevailing prejudice against it, it is greatly to be feared that the introduction of season tickets and workmen's rains, in the completest manner, as on the English roads, will only be effected with difficulty.

However, systems of this kind can succeed only in large cities, in industrial centers, or under otherwise favorable circumstances, and it must be left to the railway managements themselves to ascertain where the opportunities for them occur. By no means can we think of giving a further application of the entirely exceptional reductions of rates which must be adopted in such circumstances; for evidently it is only through a very great increase of passenger traffic that so great reduction in rates can become remunerative.

Though we do not ignore the various objections which may be urged, nor underrate the the importance of the step, in simply introducing exceptional tariffs, like those in England of 0.36 cent per mile for weekly season tickets on workmen's trains, and about 0.9 cent per mile for first-class yearly season tickets,‡ still we believe that we are the more justified in recommending the introduction of so cheap season tickets for the well-to-do classes, and the system of workmen's trains, because thus a new traffic, having little influence on the traffic heretofore existing, would be created, for the accommodation of which the existing facilities will suffice; and therefore the easier it is to introduce, and the more it is destined to become a new source of income to many railway companies.

It should not be forgotten that in Germany the primary conditions of the development of so great a passenger traffic as in England do not exist; still, in the great cities, rents have reached figures so high that, with a moderate price for season tickets, a great number of people would certainly prefer to live in the country, using the railroad every day (provided that the stations are favorably situated), rather than to occupy more cramped, more costly and less healthful quarters in the heart of the city. It is known that the city government of Berlin has repeatedly considered this question, among others concerning the cheap accommodation of workmen.

As we have already shown, low fares form only one of the elements in the development of passenger traffic, though the most immediate and important. Other elements are: supplying more frequent opportunities for traveling, such as *increasing the number of trains, shortening the time of the trips and extending the roads to the heart of the cities.* As to the number of trains, we would by no means recommend the English practice as an example. Their number is generally so much greater than that of German trains, and in numerous instances so immense, the opportunity of comparison fails us; and even in England it is doubted whether the number of passenger trains, which naturally are not always full, does not exceed the demand. But when we see that even on many secondary Scotch roads after a few years more passenger trains run than on some of the principal German roads, then it seems that we may conclude that the number of passengers grows with the increase in the number of trains.

In Germany, herotofore, too much importance has been attached to the full utilization of the motive power. Unquestionably this principle is correct, so far as freight trains are concerned, whose speed is of secondary importance; but it seems not advisable to apply it so strictly to passenger trains, since their utility depends not only on speed, but on regularity.

Aside from this, however, with so small a number of passenger trains it is inevitable that for a great number of stations the times of leaving and arriving are very inconvenient, and thus traveling is made more difficult, as has been often observed.

Experience shows that an increase in the number of trains is attended with an increase in the number of passengers; and when this growth is gradual, experiments show, even those made where traffic is light, that in this direction a wide and profitable field lies open to the railroads.

The reduction of the time of the trips is intimately related with the increase in the number of trains, since it is only with a greater number of trains that it is possible to run a certain number at high speed and with few stops.

Hitherto little has been done in Germany in comparison with the English railroads, which on most routes have a greater number of fast trains stopping only at long intervals; and although we must remember that the introduction of fast trains is very little encouraged by the light passenger traffic, and that at first it necessitates considerable sacrifice, it is still true that the greater length of the journeys is a pressing motive for facilitating the accomplishment of greater distances by shortening the time of the trips.

In a still higher degree is this true of the ordinary passenger trains, which are made to approach to the character of freight trains by using them for the transportation of cattle and fast freight, and can be used for long trips only at the cost of much time and weariness, on account of their slow rates of speed and the long stops at stations.

Happily competition has begun to have an influence on passenger traffic; and since it has not hitherto developed a tendency to reduce fares to a minimum, this competition may be welcomed on the part of the railroads, as, in addition to the numerous reforms in passenger traffic which it has already introduced, it cannot fail to give a great development to this traffic and increase the productiveness of a source of income which our railroads are far from having exhausted.

It is to an undervaluation of passenger traffic that we must attribute the fact; too little attention has been given, not only in the chief cities but even more in the provincial towns, to the establishment of stations as near as possible to the centers of business. Technical and economical considerations in most cases cannot justify the location of stations distant from the centers of towns, especially when we consider that, by the construction of special stations for passengers, the space necessary is reduced to a minimum, which facilitates their erection in the very heart of cities. The time it takes to go to the station and to reach the city from it increases materially the time consumed by the trip and increases its cost, when carriages must be used and limit somewhat the frequent use of the railroad; and their effect is still greater on daily trips—a traffic which has taken so great a development in England, and with the growth of the cities is continually extending. This traffic is made possible only by the establishment of stations in the very centers of cities, so that the time consumed on the road and in going to and from stations does not materially exceed the ordinary time of going to and from business in the city.

If we have attempted to give a complete account of English passenger traffic in the foregoing, we have done it in hopes that this special information might suffice to show the capacity of the passenger traffic of German roads for further development, which development is closely related to the progress of commerce and industry. And we believe that this object, though in a less degree than in England, can be attained without in any way compromising the favorable financial condition which the German railroads generally enjoy.

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and for all days of the week except Sundays and holidays. (Ordinary trains, to be specified, may be utilized in case of need).

The commutation tariff, applicable only to third-class travel (round trips) is fixed per week at:

3.1 miles	22.32 cents.
6.2 "	29.76 "
9.3 "	33.48 "
12.4 "	35.34 "
15.5 "	37.20 "

Which represents a rate per mile varying from 0.6 to 0.2 cents, according to the distance.—NOTE BY THE BELGIAN TRANSLATOR.

* The use of "tourists' tickets" is not very extensive in Belgium. There are only two for routes within the kingdom: the first, called "journey in Belgium," (Waes, Flanders, and Hainaut), gives a reduction of 25 per cent.; the second, called "journey on the banks of the Meuse" (Brussells, Namur, Liege, Spa, Verviers, Louvain, Malines), gives the same reduction.

There exists, further, a certain number of international routes, with 25 per cent. reduction on the ordinary price. (Journey on the banks of the Dutch Rhine, on the banks of the Rhine, in Belgium, in Holland and in the Grand Duchy of Luxemburg, etc., etc.)

These tickets do not give, as in England, the privilege of prolonging the journey beyond a fixed term, by the payment of a small additional sum—a privilege granted to the traveler which seems to us to deserve some attention also.—NOTE BY THE BELGIAN TRANSLATOR.

† As we have seen above, the actual rates on the Belgian State railroads are:

EXPRESS.

First class	2.7 cents per mile.
Second class	2.025 " " "
Third class	1.35 " " "

ORDINARY TRAINS.

First class	2.16 cents per mile.
Second class	1.62 " " "
Third class	1.08 " " "

These rates, although considerably higher than those of the decree of 1866, are yet lower than the German rates.—NOTE BY THE BELGIAN TRANSLATOR.

‡ The inequality of the burden of this tax on the several railroads gave the Chancellor of the Exchequer occasion to propose, at the last session of Parliament, in place of this tax an assessment of 1 per cent. on the total gross receipts of the railroads—a proposition which met much opposition on the part of the railroads.

§ The number of passengers carried in 1867 was:

In Great Britain and Ireland	287,688,113
In Prussia	38,766,866

Of these there were injured:

	In England and Scotland.		*In Prussia.*	
	Killed.	Wounded.	Killed.	Wounded.
By accident	19	689	0	5
By imprudence	17	8	2	4
Totals	36	697	2	9
	733		11	
One injured to	592,480		3,524,260 pass'gers.	
One killed to	7,991,337		19,383,433 "	

* The expenditures of the Eastern Railroad Company on account of the collision at Revere, Mass., in 1871, had been $434,784 88 up to the 30th of September, 1872, when the claims had been substantially settled.—NOTE BY THE AMERICAN TRANSLATOR.

†In Belgium, with a population of 4,827,833, the railroads carried, in 1866, 24,337,056 passengers, or about five times the population.—NOTE BY THE BELGIAN TRANSLATOR.

‡ As may be seen by the season-ticket tariff of the Caledonian Railway, this railroad charges for a yearly first-class season ticket $5.40 per mile. Admitting that the ticket is used on three hundred days (though the journey may be made several times every day), and we find the charge to be at the rate of 0.9 cent per mile.

Government Experiments on Steam Boilers.

The following statement has gone the rounds of the daily papers:

The Commission appointed by the United States government to inquire into the causes of steam boiler explosions, in order to determine by actual experiment the best form and construction of safety valves which shall operate automatically in relieving steam boilers from the pressure of steam, or with certainty automatically prevent any increase of pressure above that at which the valve shall be set, invite persons claiming to have valves of superior efficiency to submit one to the Commis-

gion for examination and testing. All valves presented must have an area of exactly five square inches in their discharge openings, and the flange for attaching it to the boiler must be eight inches in diameter, flat face, without bolt holes. At the meeting of the Commission to inquire into the causes of steam boiler explosions, held at Washington, it was resolved to issue a call upon those who may be conversant with facts bearing upon that subject to forward such information to the Commission. The following will probably cover most of the opinions and theories entertained by scientists and engineers on the subject: First, explosions caused by the gradual increase of steam pressure; second, those caused by low water and overheating of the plates of the boiler; third, those caused by the deposit of sediment or incrustation on the inner surface exposed to the fire; fourth, those caused by the generation of explosive gases within the boiler; fifth, those caused by electrical action; sixth, those caused by the percussive action of the water in case of a rupture of the boiler in the steam chamber (Clark & Colburn's theory); seventh, those caused by the water being deprived of its air; eighth, those caused by the spheroidal condition of the water; ninth, those caused by the repulsion of the water from the fire surfaces of the plates. The Commission intends to experiment as to the truth or fallacy of these various theories, and to that end will give its earnest attention to any communications made to them upon the subject, which should be addressed to Mr. Taylor, the Secretary of the experimental Commission, at the Treasury Department, in Washington.

It is quite true that the above cover all or nearly all the conceivable *direct* causes of boiler explosions. If, however, boilers constructed in the ordinary way have not nearly so much strength as we are in the habit of thinking they have, then evidently our ignorance and misapprehension would be sufficient to account for many boiler explosions on any of the theories named above. Lastly, we have called attention to the prevailing want of knowledge of the effects of punching and drilling boiler plates, machine and hand riveting and the best disposition of rivets in boiler seams. These subjects we think are well worth investigation by the Commission.

Contributions.

Diameter of Wheel Seat of the Standard Car.

BLACK RIVER, O., September 15, 1873.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the cut representing the finished dimensions of the *standard* car axle, recommended by the Master Car Builders' Association and published in the GAZETTE, there is one point which I think is a mistake, and there is quite a large number of the members in the same boat with me. That point is the *wheel seat* or *fit*. In the cut it is 4⅛in. After examining the report of the proceedings of the Boston convention, and raking over my own memory, I find nothing upon which to justify a belief that 4⅛in. are the correct figures. On page 51 of the annual report are found the dimensions of axle recommended by the Committee on Axles. For wheel seat it reads 4⅛in. Again, on page 58 there is an amendment offered to increase the size of journal from 3½ x 7in. to 4 x 7in., also increasing the diameter of wheel seat to 4⅛ in., but there is no record of any action being taken on the amendment. The only thing said about wheel seat is found on page 106. After the final vote was taken on size of journal, a motion was made and carried to increase the diameter of wheel-seat ⅛in., thereby making the finished dimension of wheel-seat 4¼in. Now, what is a mystery to me is where the Axle Committee get the authority to change these figures at all, and more especially after so long an interval of time had elapsed after the convention as to allow all the roads in the country to change their standard axle to the one recommended, if they saw fit, before the expected drawing is produced.

Probably some of the members who advocated a larger axle than the one recommended can explain this mysterious change of figures.

I know of quite a large number of cars that have been built, or are under contract, which have axles under them made according to the size recommended by the Association.

Light is what is wanted on this subject. A MEMBER.

Cluster Bent Trestle.

CINCINNATI, Ohio, August 30, 1873.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In a recent number of your paper a correspondent asks for a description of the so-called "cluster bent trestle." I inclose sketches which may be of interest. The design is for a bridge one hundred feet high, the bents being fifteen feet apart.

The chief peculiarity of this style of bridge is in the framing. It will be seen that there is an entire absence of mortices and tenons throughout the structure, hence giving the full strength of each piece. The "cluster" of timbers forming the posts breaks joints as shown in detail, forming, practically, a continuous post from bottom to top.

The unusually small size of the timbers used in the posts (8x8in.) renders the detection of any unsoundness in them an easy matter, and with proper care insures the use of clear timber.

The inclosed sketch* very closely resembles a trestle now in use on the Toledo, Canada Southern & Detroit Railway near Toledo, Ohio.

The bridge here referred to is only sixty feet high, and consequently is without the secondary batter-posts. The foundation there used consists of a double row of piles instead of masonry. It is entirely free from anything like diagonal bracing lengthwise of the bridge, an example in that respect of very questionable engineering, to say the least. Otherwise it presents a very fine appearance.

The inclosed design requires about twelve hundred feet B. M. per lineal foot of bridge. The posts and batter-posts are 8x8in. The girts and longitudinal braces are 4x10in. The sway braces are 3x10in. All girts are fastened by ⅞in. bolts, as shown. Sway braces are spiked on.

Packing blocks 4x10in., 20in. long, are used, as shown in detail, also wherever the girts break joints.

The "cluster bent" trestle is by no means an old invention, and seems to give general satisfaction wherever tried.

J. A. F.

* Lithograph opposite page 393.

The Jacksonville, Pensacola & Mobile Railroad.

D. P. Holland, Proprietor; S. Conant, Business Manager; Maj. Robt. Walker, Gen. Sup't.

MANAGER'S OFFICE, TALLAHASSEE, September 17, 1873.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of the 6th of September you publish a list of officers of the Jacksonville, Pensacola & Mobile Railroad Company, as follows:

"The latest list of officers of the Jacksonville, Pensacola & Mobile Railroad Company is as follows: President, M. S. Littlefield; Vice-President, Calvin Littlefield; Secretary and Treasurer, T. A. Byrnes, Tallahassee, Fla.; General Superintendent, Sherman Conant, Jacksonville, Fla.; Auditor and General Ticket Agent, James L. Taylor, Jacksonville, Fla.; General Agent, E. D. Woodruff, Philadelphia, Pa."

This list is doubtless correct as to the company, but the Jacksonville, Pensacola & Mobile Railroad Company do not now own the Jacksonville, Pensacola & Mobile Railroad, nor, indeed, do they own any railroad. The Jacksonville, Pensacola & Mobile Railroad is owned and operated as by the heading of this letter. As the list published by you is calculated to mislead the public, I beg that you will make known the real state of the case.

S. CONANT, Manager.

THE SCRAP HEAP.

Railroad Manufactures.

The Taunton Locomotive Works at Taunton, Mass., have nearly completed two new buildings, one 120 by 80 and one 90 by 50 feet, which are to be used for an erecting shop, pattern shop and brass foundry. Another new building, 100 feet square, is to go up shortly. Several locomotives have lately been sent to Montevideo, South America, and four more will soon be sent to the same place.

The Canton Wrought Iron Bridge Company at Canton, O., now employs about 100 men, and turns out an average of 125 feet of bridge work per day.

The Valley Rolling Mill at Youngstown, O., has recently increased its facilities for the manufacture of railroad iron by putting up four new puddling furnaces and two new heating furnaces, besides other additions.

The Ohio Iron Company at Zanesville, O., manufactures bar, hoop and angle iron, light T rails, railroad spikes and car axles. The company is now building a new warehouse 48 by 80 feet, and has just commenced a new mill, 80 by 166 feet, which will contain 8 and 10-inch finishing trains and an engine of 130 horse power.

The Milwaukee Iron Works now own two blast furnaces which last year used 62,000 tons of ore, of which 22,000 tons was brought from Escanaba and 40,000 tons from Iron Ridge, Wis. The furnaces turned out 37,347 tons of pig iron. The rail product of the works was 35,000 tons. The works used during the year 55,000 tons of Ohio bituminous coal, 25,000 tons of Pennsylvania anthracite and 20,000 tons of coke from Connellsville, Pa.

Signals at the Grand Central Depot in New York.

The New Haven (Conn.) *Register*, of recent date, says: "On Saturday last, at the Grand Central Depot in New York, by the kindness of station-master Franklin, we spent half an hour in the signal office of glass, at the north end of the depot, where a full view of all incoming and departing trains was obtained, and the thorough system of signalizing in force fully explained. About 150 trains leave and arrive at this station every day, and the departure and arrival of every one is controlled by the signal officer. This officer has between thirty and forty different telegraph signals to touch, on a table at his side, and none of them are labeled. He touches one half an hour previous to the departure of an express train, another at twenty minutes previous to the departure of a way train, and the movement rings a bell in the waiting-room from which the passengers are to depart. The doors open instantaneously, and the crowd of passengers can be seen making their way for seats in the train for which they have tickets. He then touches a key which causes the engineer to back his engine into position where he can be readily ordered on to his train. At five minutes before the hour of departure he rings a bell in the waiting-room and baggage-room, notifying them not to check any more baggage and not to sell any more tickets, and when the time is up he strikes a key to close the doors, and no more passengers can enter for that train. He strikes a signal which throws up a letter, either X, for the Harlem; Z, for the Hudson River, or Y, for the New York, New Haven & Hartford road, and at the same time rings a bell beside the engine, which notifies the engineer to back down. He then touches a key to ring a bell notifying the brakemen to couple on, and at the time of starting strikes a bell, and the 'All aboard' of the conductor is simultaneously heard. As soon as the train starts this officer makes a record of the departure, and immediately telegraphs to Mott Haven that such a train has left, with so many cars, and after raising signals at Fifty-third and Fifty-sixth streets, so that no incoming trains shall interfere, his duties with the outgoing train are ended.

"Of incoming trains he had also a perfect control. Whenever a train passes the junction near Mott Haven, the operator there telegraphs where it is from, how many cars, and the time it passed. At Ninety-sixth street the train strikes a signal which sets a bell ringing in the signal office, which continues until the train reaches Seventy-sixth street, and then ceases. At Sixty-first street another signal is struck which rings a bell at the signal office, which rings until the train arrives at Fifty-sixth street. If the officer in charge sees that everything is clear for the train, he allows it to run in; if otherwise, he throws out a flying signal at Fiftieth street, which will stop the train until it is ready for the entrance to the 'Grand Central Depot.' The departure and arrival of trains so frequently, without the least delay or accident, is a marvel, and is almost wholly dependent upon the signal officer. With the present arrangement and competent officers in charge, an accident to an incoming or outgoing train is an impossibility."

The Erie Bridges.

The contracts for these bridges were awarded to a number of firms. The Phillipsburg Manufacturing Company were awarded thirteen small structures; Charles Macdonald, of New York, got the largest work; the Baltimore Bridge Company, the Watson Manufacturing Company and the Detroit Bridge Company all have contracts for at least one structure.

A Wooden Railroad in South Carolina.

A wooden railroad 15½ miles long has lately been built from Manning Court House, S. C., which is thus described by a local paper:

"The wooden stringers or rails are four by five inches, and are fastened to the cross-ties by long iron spikes passing through both stringer and cross-tree. The stringers are five inches on their face and the wheels of the rolling stock five inches wide, thus distributing the friction over a large surface and doing little injury to the rails. The flanges of the wheels are two and a half inches deep, preventing any probability of running off the track. The engine cost but $1,800, but is able to pull seven or eight cars at a good speed. The road is regarded as a success and yet it cost only about $1,200 per mile besides grading."

Track Gauge and Level Indicator.

This apparatus, patented in Belgium by MM. Camozzi and Schlösser, is intended to measure and indicate exactly the variations in the gauge and level of railroad tracks. Whatever may be the care and accuracy with which rails are laid in the first place, displacements are not long in occurring, and these necessitate a constant unification and rectification of the track.

For this purpose the two operations are usually affected by the aid of an iron bar with two studs on the lower edge properly situated, which is placed upon the track at intervals. A level placed upon the straight edge permits the ascertainment of the differences of the height in the rails. This operation, which is both troublesome and long, is of doubtful accuracy.

To remedy this, MM. Camozzi and Schlösser have designed a very simple and cheap apparatus, by the aid of which, while passing above the track without stopping, variations of level and grades may be measured.

This apparatus is mounted upon four wheels and the workman moves it by pushing it by two handles placed at a suitable height. One of these wheels being constantly pushed outward by a spring, is always in contact with the inner edge of the rail upon which it turns, and the other wheel on the same axle is under similar conditions. The first named wheel is turned off on the inside, and the end of a rod passed by a spring is always kept in contact with the turned part of the wheel. The other end of this rod is jointed at right angles near the middle of the axle to a large perpendicular needle whose axis on which it plays is one-fourth of its length above this joint, and while its upper pointed end plays across a segmental scale about the height of the eye above the track. This scale is divided so that the position of the needle to the right or left of a perpendicular indicates exactly the amount that the gauge is too wide or too narrow.

Variations in level and grades are shown by a pendant needle (equivalent to a plumb line) which hangs over and almost in contact with a horizontal plane surface, about the height of the axle, which plane has a double scale, one reading parallel with and the other perpendicular to the axle. The needle will point to the intersection of these scales when the wheels are standing on perfectly level track with rails of equal height; a variation to the right or left indicates that the right or left rail is so much lower than the other; a variation forward or backward indicates that the wheels are on an incline, and the direction and the exact rate of the grade between the two axles. A pretty heavy weight on this changing needle prevents its oscillating too easily.

We have made our description from a drawing and explanation published in the Belgian *Chronique de l'Industrie*.

An Intelligent Brakeman.

At the coroner's inquest on the bodies of those killed in the recent accident on the Detroit & Milwaukee road at Muir, where a freight train ran into the rear of a broken-down passenger train, the brakeman who was sent back to flag the freight train, and whose neglect to go far enough caused the accident, testified as follows: "I don't know exactly how far a mile is, but I should think about eighty or ninety rods. I think that is about the distance from the bridge to the place of collision. I don't know exactly how many feet there are in a yard, but I think there must be about eight."

Illinois & St. Louis Bridge.

The St. Louis *Republican* of September 15 says: "It was intended to put in the connecting tubes of the first arch of the bridge yesterday morning at 6 o'clock. The workmen did not arrive until 8 o'clock, and by 9 o'clock one of the tubes was put in its place. It fit to a hair, the temperature being exactly right, below 60 deg. By 10 o'clock the rise in the temperature expanded the iron in the arch so that the other tube could not be fitted to its place, and the consequence was that the first tube had to be taken out and the work of fitting on the tubes and closing the gaps has been postponed until this morning at 6 o'clock."

English Rail Exports.

The British Board of Trade reports show that the total exports of rails from Great Britain to the United States in July were 13,925 tons in 1873, against 41,305 tons in 1872 and 42,385 in 1871. For the seven months ending with July the United States took 134,393 tons in 1873, 300,361 in 1872 and 287,169 tons in 1872.

No Seat, No Pay.

In the Cincinnati Board of Aldermen a street-car ordinance has been introduced which contains amongst other provisions, this clause:

"Every passenger shall be provided by the conductor with a seat inside the car, and in no case shall fare be collected or demanded from a passenger unless such a seat is furnished upon his or her entering the car. The rule of 'no seat, no pay' shall be strictly adhered to by all conductors. Any conductor guilty of a violation of this provision shall, on conviction thereof, be liable to a fine of $10 and costs of prosecution."

Street car passengers in other cities besides Cincinnati will hope for the passage—and enforcement—of a similar ordinance.

Reward Offered for Self-acting Couplings.

The Union of German Railroad Administrations has determined to award prizes—one of 3,000 thalers ($2,250), another of 1,000 thalers ($750)—for the invention of a contrivance by means of which the coupling of railroad cars can be effected without the necessity of stepping between the cars. The inventions submitted for competition must have been tried practically by one of the railroads belonging to the Union previous to the sending in of the papers, and the proposition for the award of the prize must emanate and be supported by one of the said railroads. The premium does not debar the inventor from patenting the invention and enjoying the benefit of the patent. The papers must so explain the invention by illustrations, drawings, models, etc., that an opinion can be easily formed of its quality, practicability and working; and must be sent in, carriage paid, to the head office of the confederation, Berlin, Prussia, before the 1st of July, 1874. The examination of the competing plans, as well as the decision, whether general or in the form of an award of prizes, will be undertaken and decided by an examining committee, consisting of twelve members, appointed by the confederation.

The Baltimore Bridge Company.

The contract recently let to this company by the Philadelphia, Wilmington & Baltimore was only for a single span of the Susquehanna bridge, and not the whole bridge as stated. The other spans do not yet need renewal.

A statement published by the company shows that up to January 1, 1873, it had built 43,657 lineal feet of bridging. This includes many important works, such as the St. Charles bridge over the Missouri, the Chicago, Rock Island & Pacific bridge over the Mississippi at Rock Island, the Greenbrier bridge on the Chesapeake & Ohio, the Sidney Center viaduct on the New York & Oswego Midland, and the Agua de Varrugas and Arequipa viaducts in Peru.

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Editorial Announcements.

Removals.—The Chicago office of the RAILROAD GAZETTE *has been removed to No. 77 Jackson street, opposite Third avenue.*

The New York office of the RAILROAD GAZETTE *is removed to Room 131, No. 73 Broadway, opposite the upper elevator landing.*

Correspondence.—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Inventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. ***We give in our editorial columns*** OUR OWN ***opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.***

THE RAILROADS AND THE PANIC.

The events of the past week in New York, threatening ruin to brokers and bankers and seriously involving nearly all business, as any events or excitements which interfere with the regular working of banking institutions and tend to destroy credit always do, concern railroads very nearly. Railroads are charged with having caused the panic, and they are likely to feel its effects more severely and for a greater length of time than almost anything else. No one seems to expect to be able to negotiate the securities of new railroad companies hereafter, for a long time to come at least, at the financial centers, and the consequences of such inability may be more extended than many people would suppose.

We need not tell our readers that we have not been advocates of the rapid railroad extension of the past three years; that we have expressed our belief that much of the new work was altogether unwise, that the general effect of the too rapid multiplication of new lines was to prevent and not to promote economy in transportation. The means of transportation, in a great many districts, have increased much faster than the population and products to be transported. The railroads have increased 13 per cent. yearly, while the population increases by 5 per cent. and wealth probably not more than 7 per cent. yearly; and while production increases somewhat more rapidly than population, it does not grow so fast as wealth, and traffic is pretty nearly in proportion to production. For three years past, then, our railroad mileage has increased 42½ per cent., the population probably not more than 6½ per cent. and the wealth not more than 22½ per cent. That is, with two-fifths more railroads we have only one-sixteenth more people and less than one-quarter more property to be carried. If we count that traffic is in proportion to wealth, then the average traffic for each mile of railroad in the country is 14 per cent. less than it was about three years ago.

This is the view we have taken of the subject: that railroads constructed at a greater rate than the growth of the traffic must either fail or increase the average cost of railroad transportation, accordingly as they should be confined to new traffic, or should take traffic from the old roads. Should they secure an average traffic they would inevitably decrease the business of the older roads; should they be confined to the 22½ per cent. increase of traffic, this average business would be less than half of the average of the old roads, which would not be enough to support them.

Of course, the issue has been various with varying circumstances. Some new roads have secured a large traffic at once, taking much from competing lines and developing large new traffic. Others have developed little new business and diverted little old; and such are seeing hard times, or soon will. Generally reports show that the old companies have not lost earnings largely, though these reports are often deceptive on this point, from the fact that the old company frequently (and we can almost say generally) works a considerable new mileage, and the large increase in earnings may, after all, come from smaller earnings per mile. Our report of earnings for the eight months ending with August, published last week, which gives mileage and earnings per mile for 1872 and 1873, shows that while the twenty-five companies (with nearly one-fourth of the miles worked in the country) reporting showed an increase of 11 per cent. in total receipts, this was yet but 4½ per cent. more per mile. But not many of the new roads report, and most of those which do show light receipts.

Under the circumstances, therefore, it seemed inevitable that many of the new lines would not succeed—that is, would not for some time pay a reasonable income on the whole amount invested. Where a considerable part of the cost of the road was met by local subsidies or stock subscriptions, the result need not be any failure to meet engagements, except with very badly placed roads, and the injury to the community would be only that (much to be deplored, doubtless,) which always results from the investment of wealth where it is unproductive, or less productive than usual. But when the road is constructed from the proceeds of its bonds almost exclusively, then the holders of its securities suffer from its want of success; faith in railroad securities generally receives a shock, and when the creditors are banking institutions the disaster may touch the whole community.

It has been some time since the investing community at home and abroad, and abroad especially, showed a growing distrust of this too rapid railroad construction. The *Nation*, about a year ago, sounded a very decided alarm which we and several of our contemporaries commented on at the time, and which doubtless did much to attract attention to the subject. It became more and more difficult to sell the bonds of most new railroads, and it became pretty evident early this year that we could no longer build railroads at a rate which would add one-eighth or more to the mileage every year. Still, of course, the disposition to construct remained; contractors were as eager as ever to make great profits by the construction of lines taken on their own terms, as so many lines were, and communities had not then (and have not yet) learned that it costs more to keep two railroads than one, when there is work for but one, just as it does to keep two horses for a gig, to which only one can be hitched at a time.

And, moreover, investors did not wait until the lines begun were completed before they closed their purses, and scores of enterprises, good, bad and indifferent, were caught in the lurch. Several millions of dollars may have been expended toward constructing a work which could only be made to return an income by the expenditure of several millions more. If these latter millions could not be had, evidently the former would be wasted. And it is not alone roads partly graded, or graded and wanting iron, that needed additional expenditures. Railroad men know very well, though the average investor does not, that it is rarely that a road is in condition to make net earnings when the rails are first down. The large expense of equipment once met, we may be and usually are still in need of capital. It usually takes some time to develop traffic, even on a well placed road, but interest on the bonded debt must be met from the beginning. This is not always sufficiently considered by railroad managers themselves. But the interest on the cost of construction during the period required to develop a traffic which will produce net earnings sufficient to meet this interest is one of the legitimate elements of the cost of a railroad, and should be acknowledged and not concealed, as it frequently is, as though it were something to be ashamed of. To so great an extent has it been concealed that, no doubt, now it would be almost impossible to sell bonds at any rate were it known that the proceeds were to be used to pay the interest on previous issues.

It is on this account that the financial crisis may have an extended effect on new railroads in operation, and not be confined entirely to those which are still incomplete. It is a matter of life and death with some companies, doubtless, that their credit should remain good for a year or two longer, until they have more fully developed their traffic. And when they are so situated as to be able within a short time to secure a traffic sufficient to support them, it is of public importance also that they should not fail of credit. When they are so situated that they are not likely to be supported by their traffic for years, if at all, it is probably quite as well that they should go down now and save any further waste of capital in attempts to support them.

We may be too hasty in assuming that hereafter the bonds of new railroad companies will find fewer customers even than they have recently. But the assumption is generally made, and for reasons which are deemed sufficient. It is true that there has been no recent great default, such as would be likely to precipitate such discredit, and the present crisis is not due immediately to the failure of companies to pay, but to their failure, or their agents' failures, to sell their bonds. The companies most concerned in the recent failures have so far redeemed their coupons promptly, and in one case only, so far as we know, has there been any serious delay in meeting their floating debts. If the reader recalls the circumstances of the first and chief failures—those of the New York Warehouse and Security Company, of Kenyon, Cox & Co., of Jay Cooke & Co., and of Fisk & Hatch, he will remember that their suspensions were caused by the large advances made by them on the bonds of new railroads, which they have been unable to dispose of. The experience of the past two or three years has probably led bankers to suppose that railroad bonds of lines in construction, supposed to be promising, could be sold pretty readily in the course of a few months, however tight the money market might be at the time, and on this assumption they have acted more generally than had been suspected, it appears. Lending money in large amounts on such paper, they have been utterly dependent on their success in negotiating the bonds which they took as security, for the amounts lent seem to have been very much greater than the banking houses could permanently invest, the advances being really from their working capital. Now, no matter how good the security of these bonds, their availability for banking houses depends entirely on their negotiability, and money loaned on the very best of such securities is as much locked up as if it were invested in real estate, *if no customers can be found for the bonds.* Such seems to have been the case in these instances. Investors would not take up the bonds fast enough to release the loans made by the bankers when their capital was imperatively demanded by their business, and they have suspended with immense surpluses of railroad bonds whose interest has always been paid promptly and perhaps will be hereafter.

The great danger for the railroad companies is that the tightness of the money market and the general distrust in new securities which this panic may cause—probably has caused—will prevent their putting themselves into position to meet their engagements. It is only too probable that some companies, which, but for this untoward event would have been able to prepare for and do a business which would enable them to meet all their engagements promptly, may now fail to secure the small additional capital needed, and so be prevented from earning what they might, or even from earning anything, and therefore become bankrupt. And investors should bear in mind constantly that when their securities are on unfinished or undeveloped lines, almost the only possible way to secure their investments is to see that enough more capital is procured to make productive the property which is mortgaged to secure them. There are perhaps some half finished lines which it will pay to complete, and there are doubtless not a few lines which may be made productive if not made of the whole length intended; but generally the completion of a line or a part of a line so that trains can run over it will well repay the bondholders for further advances, and is the only way to prevent a total loss of their investments. So, if there shall be a disposition to avoid new investments, there will—at least should be—a strong effort on the part of those who have already invested to make or secure subscriptions enough to render productive the works in which they are interested. Holders of the securities of unfinished railroads should remember this and act accordingly.

LOCOMOTIVES FOR CITY AND UNDERGROUND RAILROADS.

It is now very evident that the facilities for travel which are demanded in large cities can only be supplied by railroads operated by steam power, and therefore that such roads will of necessity become a portion—and each year a more important one—of the system of intercommunication between the different sections of such places. It is also very plain that the speed at which trains must be run on such roads makes it absolutely

essential that they should be built either *over* or *under* the streets and ordinary channels of communication. The construction of such lines presents no very difficult problems of engineering, or none which differ materially from those which are encountered in building ordinary roads; but in operating such lines obstacles present themselves that are not so easily overcome, and are peculiar to their traffic and location. It is comparatively easy to run long and heavy trains through tunnels at intervals of thirty minutes or more, without experiencing much trouble from the vitiation of the atmosphere by the smoke and steam from the engines, but the case is quite different when trains loaded with passengers must be run every two minutes, as is now the case on the London underground railroad during the busy portions of the day. It then becomes absolutely necessary that some provision should be made to prevent smoke, noxious gases and steam from escaping from the locomotives, if the air is to be kept in a condition which at all approximates purity. A great deal of ignorance has been displayed in the daily papers and elsewhere regarding the consumption of smoke in tunnels, in assuming that the whole difficulty of proper ventilation was due to the smoke which is visible. The truth being that the less smoke there is, the more unfit the air becomes for respiration, as no combustion can take place without the consumption of oxygen and the production of noxious gasses, which, if permitted to escape in a tunnel, vitiate the air. Another evil which attends the escape of steam is that it obscures vision and prevents signals from being seen. On elevated roads there is, of course, not the same trouble from the vitiation of the atmosphere as there is when locomotives work in the confined atmosphere of a tunnel, but the escape of smoke and steam frightens horses, and is a nuisance generally. The same thing is true, only to a less degree, of locomotives working in open cuts. The problem which presents itself, therefore, is to prevent the escape of smoke and steam, and, in tunnels, of noxious gasses from locomotives intended for service on such roads as we have described.

Any one who has ever studied this subject will know the difficulty of fulfilling all these conditions, and, notwithstanding the experiments which have been made on the London underground railroads, we learn that there the ventilation is very unsatisfactory, and a cause of continued complaint. In a leading article on this same subject recently published in *The Engineer* the expedients which have been adopted to remedy this evil and the method of operating this line are described as follows:

"The line was first worked by broad-gauge tank engines with six wheels, four coupled, and outside cylinders. They were fitted with tanks under the boilers, into which the waste steam was turned and condensed, the heated water being discharged at Farringdon street and Paddington. The length of the run was, roughly stated, about three miles. This arrangement, on the whole, disposed of the steam satisfactorily, and so long as not more than six trains per hour traversed any given section of the line, there was not much to complain of as regarded ventilation. By degrees, however, the number of trains increased, and complaints began to be heard about the state of the atmosphere. Then came the dispute between the Metropolitan and the Great Western companies. The latter refused to work the line, and as the Metropolitan Company had no locomotives ready, the Great Northern Company conducted the traffic with some of their ordinary goods engines, the waste steam being led into the tender by a flexible pipe. These tenders held more water than the tanks of their predecessors, and the steam gave no trouble whatever, but the fire-boxes were comparatively small and the blast was often required to urge the fire. As a result the air became more impregnated than ever with sulphuretted hydrogen, sulphurous acid and carbonic-acid gas. The public complained lustily, but Mr. Fowler designed the engines and rolling stock now in use, and the public were assured that once these engines were put on there would be no more trouble. Immense fire-boxes were used to avoid the necessity for a draught—as the world was told—and the steam was got rid of in the side tanks. It is probable that if the number of trains had remained small these hopeful anticipations would have been to a great extent fulfilled; but the traffic increased enormously, reaching at last to one thousand trains in twenty-three hours—an hour at night being reserved for repairs—or more than forty-three per hour. Nor does this number represent the whole traffic now run through Farringdon street and up to King's Cross and Paddington, for it does not include the trains run by the Great Northern, Great Western and Midland Companies. Nor was the increased number of trains the only difficulty with which the Metropolitan Company have had to deal; in addition the length of each run has been augmented. Instead of working with the dampers down, they are worked full open, and, catching the air as the train runs, there is actually in practice so rapid a combustion effected that the engines make steam during the whole run. The consumption is about 32 pounds per train mile; and, as the engines seldom use their blowers while standing in stations, it is obvious that almost the whole of this is consumed when running—that is to say, in the tunnels. The water carried is also insufficient to condense all the steam. It becomes nearly boiling hot at the end of the run, and there is therefore a very considerable escape of steam in the tunnels near each terminus. On the Metropolitan District line there is apparently some difficulty about getting an adequate supply of water, and the engines run from the Mansion House to West Brompton, and back, without changing the water in the tanks. The consequence is that steam escapes in clouds from the engines running into the Mansion House Station, and one serious accident has occurred because it was impossible for the driver to see the signals. For some time past this difficulty has claimed all Mr. Speck's attention, and we know that he has been experimenting with a view to get rid of it. For example, he has led the waste steam through the furnace, in order to superheat the exhaust and render it invisible. The plan has answered tolerably well in all respects but one—the consumption of fuel was, from some cause not very easy to explain, increased by nearly 50 per cent."

From this it would appear that the exhaust steam can be disposed of satisfactorily by simply providing a sufficient quantity of cold water for condensation, and that this quantity is not greater than can be carried on an ordinary tender. The use of atmospheric condensers has also been suggested, these to be arranged like ordinary surface condensers, but the tubes to be covered with some sort of absorbent substance which could be kept moist. These tubes are then to be exposed to a current of air, which would evaporate the moisture on them, and thus reduce the temperature low enough to condense the steam inside. Instead of water, the use of some more volatile liquid has been proposed for moistening the outside of the condensing tubes. If some of the mixtures which are used to produce artificial freezing were employed, a very low temperature could be produced by their evaporation.

As many of our readers know, the freight cars of the Hudson River Railroad are moved through the streets of New York by "dummy" engines. These are employed on the street in the midst of the ordinary traffic of the city, and long trains of cars are drawn from Thirtieth street to the freight depot in the lower end of the city. To make them as little liable as possible to frighten horses, they are inclosed to resemble a four-wheeled freight car. For the same reason it was necessary to make the exhaust steam invisible and noiseless. This is done by condensing it first in a surface condenser, and then conducting the steam which escapes from the condenser into the water tanks. These form the sides of the cab or inclosure of the engine. They are made as long and high as practicable, and only a few inches wide, so as to expose as much surface to the atmosphere as possible. The cold water is pumped through the condenser and then back to the tank again, where it has an opportunity to become partly cooled by the exposure of the sides of the tank to the cold air. The fire is stimulated by a separate blower. These engines work very satisfactorily, and the exhaust steam is thus condensed so as to prevent its being any serious annoyance. The engines, however, work at very slow speed, and not continuously. They have four wheels coupled, and are worked by gearing. The whole weight of engine and tanks is carried on the four wheels. The fuel is anthracite coal, which makes no smoke. While these engines work very satisfactorily when they make only a few trips per day, the noxious gasses from the combustion of anthracite coal would, we think, cause very serious annoyance if they ran every minute or two, even in the open streets, and would certainly vitiate the atmosphere in a tunnel to such a degree as to make it unfit for respiration. The Elevated Railroad, in Greenwich street, is operated by small four-wheeled engines, which burn anthracite coal, but do not condense the exhaust steam. At present only two or three trains are run per hour, so that we have heard no complaint of the escaping gases of combustion, which will, of course, grow more annoying as the number of trains increases.

Notices have been published in these pages from time to time of experiments which have been made with hot-water locomotives. These were to be supplied with water heated to a very high temperature in stationary boilers. The supply of steam was then drawn from this heated water. One engine of this kind which seemed to promise very good results was first heard from in New Orleans, then on the Coney Island Railroad in Brooklyn, and last in Chicago. We regret not being able to give any trustworthy particulars concerning the operation of this engine.

Compressed air stored in suitable receivers has also been used experimentally, but the manifest impossibility of carrying sufficient quantities for any sort of heavy traffic is an insuperable obstacle to the use of this plan.

The Engineer, in the same article from which we have already quoted, suggests the use of stationary furnaces on the well-known Siemens plan, to be arranged at each terminus so that the "engines could be run over a suitable gas burner, and steam would be got up with lightning speed." It is difficult to see, however, what advantage this method would have over that proposed by Dr. Lamm, who, we believe, is the inventor or designer of the peripatetic hot-water engine we have referred to above. His plan was to heat the water in the reservoir of the locomotive by injecting hot steam into it through perforated pipes. These latter formed a portion of the reservoir, and it was only necessary to attach a steam pipe connecting the reservoir with the stationary boiler and turn on steam to commence heating the water in the locomotive. This plan has the advantage that a supply of heat, in the form of steam, can be accumulated or stored up, a portion of which can be transferred to the locomotive much more quickly than the same amount of heat could be generated by a gas burner.

It must be remembered, however, that there are a great many tunnels so located that it would be difficult to use one kind of engine in the tunnel and others of the ordinary kind outside. It is probable, too, that such cases will become more common every year. If then some method could be devised by which this escape steam and smoke could escape from the engine into what we will call a "ventilating apartment" without being diffused in the tunnel itself, the air in the latter would be kept pure, and the noxious gasses could be exhausted by some powerful means such as are employed in the ventilation of mines. Such a ventilating apartment could have a longitudinal channel extending the whole length of the tunnel. Into this channel the chimneys of the locomotives could be made to project, so as to deliver the smoke and steam fairly into the ventilating apartment. If then a powerful current was exhausted from this apartment, the air would be drawn *from* the tunnel into the channel referred to; so that there would be little danger of the smoke and steam being drawn back again into the tunnel if they were once delivered completely into the exhaust apartment. If such a plan were once adopted, it would make it practicable to use ordinary locomotives for tunnel service in metropolitan roads without any other modification than that required in the smoke-stacks.

That there will be a great demand for engines adapted to this kind of service seems now absolutely certain, and we have written these rather inconclusive suggestions to call the attention of inventors and engineers to the subject. Whether the inhabitants of large cities will hereafter imitate the mole and barrow under ground, or, following the example of birds, make their pathways in the air, it is quite certain that locomotives will be needed which will be noiseless, and which will not contaminate the atmosphere.

The Railroads First Affected by the Financial Crisis.

The recent failures precipitated by advances made on railroad securities which have proved to be unsalable at present have called special attention to the companies which have issued the securities. It seems to be taken for granted that it will not be easier, but, on the contrary, more difficult, to sell these securities hereafter than heretofore, not necessarily because they have turned out badly as yet, but because in connection with them much evil has happened, and credit is a plant so tender as to be nipped by a very indirect blast. At all events money is likely to be close, and there can be no improvement expected in the market for such bonds for some time to come. It is proper, then, to inquire into the circumstances of the companies whose securities have been brought into notice in so unpleasant a way, and see what is likely to be the effect on these companies should their paper be entirely unsalable hereafter.

The immediate effect of such a discredit would be, of course, the cessation of new construction, and our inquiries, therefore, should be directed towards ascertaining the productive capacity of the lines as they exist at present.

THE MISSOURI, KANSAS & TEXAS.

The first trouble was to the New York Warehouse and Security Company, on account of advances made on the securities of the Missouri, Kansas & Texas Railway Company. This corporation has been constructing railroads for about five years and has now completed its system, though it has charters for other lines in Texas, which, however, are in no respect necessary to the completeness of its system. It is peculiarly situated, for more than one reason, as we will endeavor to show. It has, however, the great advantage of having completed its line and equipped it tolerably, so that it will be able to carry all the traffic that is likely to be offered it. The first of its lines was constructed from a junction with the Kansas & Pacific at Junction City, Kan. (138 miles west of Kansas City), southeastward to the Indian Territory at Chetopa, Kan., a distance of 180 miles. This road was one of the Pacific railroads chartered by Congress, and was known as the "Southern Branch, Union Pacific." It is most awkwardly situated, running at right angles with the prevailing course of traffic, and the explanation of this location must be sought in the fact that when Congress chartered the Pacific Railroad it felt bound to connect all the Western towns with it; and as the main line ended at Omaha, the "Central Branch" at Atchison, the "Eastern Division" (now Kansas Pacific: it was originally intended to connect with the Union Pacific at the 100th meridian) at Leavenworth and Kansas City, so the "Southern Branch" was to serve Memphis, New Orleans and the other Southern cities with a direct connection with the great route to the Pacific. It was endowed with a valuable land grant, however, and ran through a fine country, which has settled very rapidly: and the land grant alone was doubtless sufficient inducement for building the road. When it was completed, however, its proprietors seemed to feel the need of adding to it, so that it might be better utilized, and they have since constructed a very well placed system of roads, whose direction conforms well to the tendencies of traffic. The most important of these, doubtless, is that from Sedalia, Mo., southwest 159 miles through Fort Scott to the original line at Parsons, Kan., 24 miles northwest of Chetopa. Nearly or quite all of this line runs through a very fertile country, to which it affords the shortest existing and very nearly the shortest possible route to market. Then it constructed a longer line, which is much better known, from Chetopa south by west 249 miles, entirely across the Indian Territory, to and across the Red River to Denison, Texas, eight miles south of Red River, where it connects with the Texas system of railroads, and gives them their sole connection with the railroad system of the country, though the Cairo & Fulton will give them another

and shorter one within a month probably. This line is unlike any other in the United States, for the country on it is virtually forbidden to grow, being dedicated to the Indian tribes, and white men being excluded from it. But for this it would doubtless in no very long time furnish a splendid traffic, for the country is probably the best in the United Stated still unsettled, the climate is one of the finest, and thousands of men are waiting and anxious to go in and occupy the land. Moreover, the charter of the company entitles it to a land grant of about 3,000,000 acres in this territory, in case the Indian title should be extinguished. The extinguishment of the Indian title and the opening of the territory to settlement is therefore very much desired by those interested in the company, and would doubtless be of immense advantage to it. But with the government and people of the United States it is not a question of political economy, but of morals; and the sentiment prevails widely that to open the territory to settlement would be virtually signing the death warrant of the Indian occupants, who have been guaranteed undisturbed possession on the faith of the nation, and have really (for Indians) made great progress toward civilization. This line at present is the only all-rail route to Texas, and it is well situated for carrying cattle—the great Texas staple—northward, and such goods as are imported from the North southward. It also carries some cotton, and its through traffic will doubtless increase as Texas grows, and Texas is growing very rapidly. It will not long have a monopoly of the traffic, however, for the Cairo & Fulton in a few weeks will connect with the Texas & Pacific, and through it with the other Texas railroads, and this line will form a somewhat shorter route to St. Louis and Chicago and the other western cities east of the Missouri River, and a much shorter route to places further east.

Besides these lines the company owns a short isolated line from a junction with the Missouri Pacific at Holden (43 miles west of Sedalia) west 54 miles to Paola, Kan., and it has this year completed a line from Sedalia northeastward, crossing the Missouri at Boonville, to Moberly, Mo., 72 miles, and has leased the Hannibal & Moberly Railroad thence to Hannibal, 70 miles, so that it works a continuous line from Hannibal, Mo., in a generally southwesterly direction to Denison, Texas, a distance of 574 miles. This gives it a direct outlet to Chicago and a choice of routes to Eastern cities.

The entire system of the company now completed, including the leased section between Hannibal and Moberly, embraces 784 miles of railroad.

The funded debt of the company, according to its last report, amounted to $16,596,000, which is at the rate of about $23,000 per mile of road owned, all bearing 7 per cent. gold interest, or a yearly obligation (at present price of gold) of about $1,800 currency per mile. The company is one of the few new ones which reports its monthly receipts. These, as may be seen by reference to our table published last week, were at the rate of $3,062 per mile for the eight months ending with August, much of the road having hardly got fairly at work. The working expenses were reported at 60 per cent. of receipts for the year ending with March last, and if this proportion is continued, the current year promises to yield net about $1,900 per mile. Being new, its expenses for maintenance should be very light.

THE CANADA SOUTHERN.

The second failure was that of Kenyon, Cox & Co., caused, it is said, on account of advances made to the Canada Southern Railway Company (but probably to the Canada Southern & Chicago on account of the Canada Southern). This road again is peculiarly situated. There is nothing like it in America and hardly in the world. Its gradients and alignment are so extremely favorable that it is doubtful whether on any other line of equal length in America trains can be moved with so little expense for motive power. On the other hand, it is questionable whether any other long line in America (with the exception of the Brunswick & Albany perhaps) is so poorly designed to secure local traffic. Local traffic seems not to have been aimed at, for there is but one town of a thousand inhabitants on the line. Its line from Fort Erie (opposite Buffalo) westward to the Detroit River at Amherstburg is 229 miles long, and nowhere distant from the shore of Lake Erie, and it has a branch from St. Thomas west to the St. Clair River opposite St. Clair, Mich., 67 miles. The track was laid on these lines early in the spring, but the road has been regularly opened for business but a few weeks, and as yet it has no connections from which to receive a through traffic. It is admirably calculated for a heavy through traffic, as we have intimated, and with its very light local traffic a through business is indispensable for its support. Owing to the composition of its directory, it was hastily assumed when the road was begun that it would secure the through traffic to and from the great systems of the Chicago & Northwestern and the Chicago, Rock Island & Pacific, which would have formed a pretty handsome traffic in itself. Since that time, however, a Lake Shore man has been made President of the Chicago & Northwestern. A year ago the Toledo, Wabash & Western chose a directory largely composed of Canada Southern men, and then again it was hastily assumed that the through traffic of the Wabash was secured to the Canada Southern. Now, however, another Wabash election is at hand, and it is reported that the new board will maintain close relations with the Lake Shore, whatever it may do with the Canada Southern. Meanwhile its Chicago line is but fairly begun, and the only connection of which it seems sure is the Toledo, Canada Southern & Detroit, which will give it access to Detroit and Toledo. If it should get the Wabash through traffic, this with the local business from Detroit and Toledo might give it a considerable train movement, though of a traffic which pays comparatively small profits. Without the Wabash through traffic it is not easy to see how it can be supported, at least until it has a line to Chicago.

The bonded debt of this road is at the rate of about $30,000 per mile, bearing 7 per cent. gold interest, which requires annual payments of about $2,350 currency per mile, which could probably be netted from gross receipts of $7,000 per mile, though an exclusively through traffic might require a considerably larger proportion than two-thirds of the receipts for working expenses.

THE NEW YORK & OSWEGO MIDLAND.

Though the bankers of this company, which has long suffered from financial difficulties, have up to this writing held out firmly, and may not have suffered to an appreciable extent by their connection with it, the company itself is deeply involved, and its property is now in the hands of a receiver. It was not managed by its original executive in a way to secure confidence with those who watched it, though until a comparatively recent date it was very successful in selling its bonds. For some reason its operations have not been confined to completing its road, as originally intended, but it has constructed, bought or leased a large mileage in branches, so that while it is but recently that it completed the line from New York to Oswego, 333 miles, it has for some time had branches completed measuring 221 miles. Of these 57 miles is in four short branches; one is the Montclair Railway, in New Jersey (which it contracted to lease, but has not yet for want of some legislation), and one is the Utica, Clinton & Binghamton, from Smith's Valley, 81 miles from Oswego, northeast 31 miles to Utica, with a sub-branch (the Rome & Clinton) from Clinton north 13 miles to Rome. Last year, we believe it was, it began the construction of its "Western Extension," which is now reported to be 85 miles long, extending by a zigzag route from Norwich, 223 miles from New York, to a village west of Lake Owasco about 10 miles southwest of Auburn. The new line is a little longer than the two other routes to Oswego, though not enough to put it at any considerable disadvantage, but it has some very heavy grades, and more than half of it is through a very thinly peopled and unproductive country, which can never afford a considerable local traffic. The road altogether might be not unprofitable if economically constructed, but it has made a lease of the New Jersey Midland, which forms the south 74 miles of its lines, on preposterous terms, amounting to $7,000 per mile per year. If the Western Extension is wholly its own property, it owns about 390 miles of road. Its funded debt was, at the end of March, reported to be $12,000,000, which is at the rate of $30,770 per mile of road, but we do not know that this covers the "Western Extension" bonds. All these bonds bear 7 per cent. gold interest, and the interest charge per mile of road owned would thus be $2,400 currency. We believe, however, that this debt has been largely increased since March. Of the bonds two-thirds are first mortgage. The present administration reports that the company has a floating debt of about $4,000,000, which doubtless could not be retired by an issue of bonds less than one-eighth greater in amount, even in ordinary times and with ordinary credit. This floating debt would make the total interest-bearing liabilities of the company about $40,000 per mile, the interest on which would probably absorb the net earning of a gross traffic of $10,000 per mile. With sufficient rolling stock the company should now be able to do all the New York-Oswego business that offers. Its Western Extension cannot be utilized for through traffic until about 130 or 140 more miles of road have been built. The company received large subsidies from places on the line.

THE NORTHERN PACIFIC.

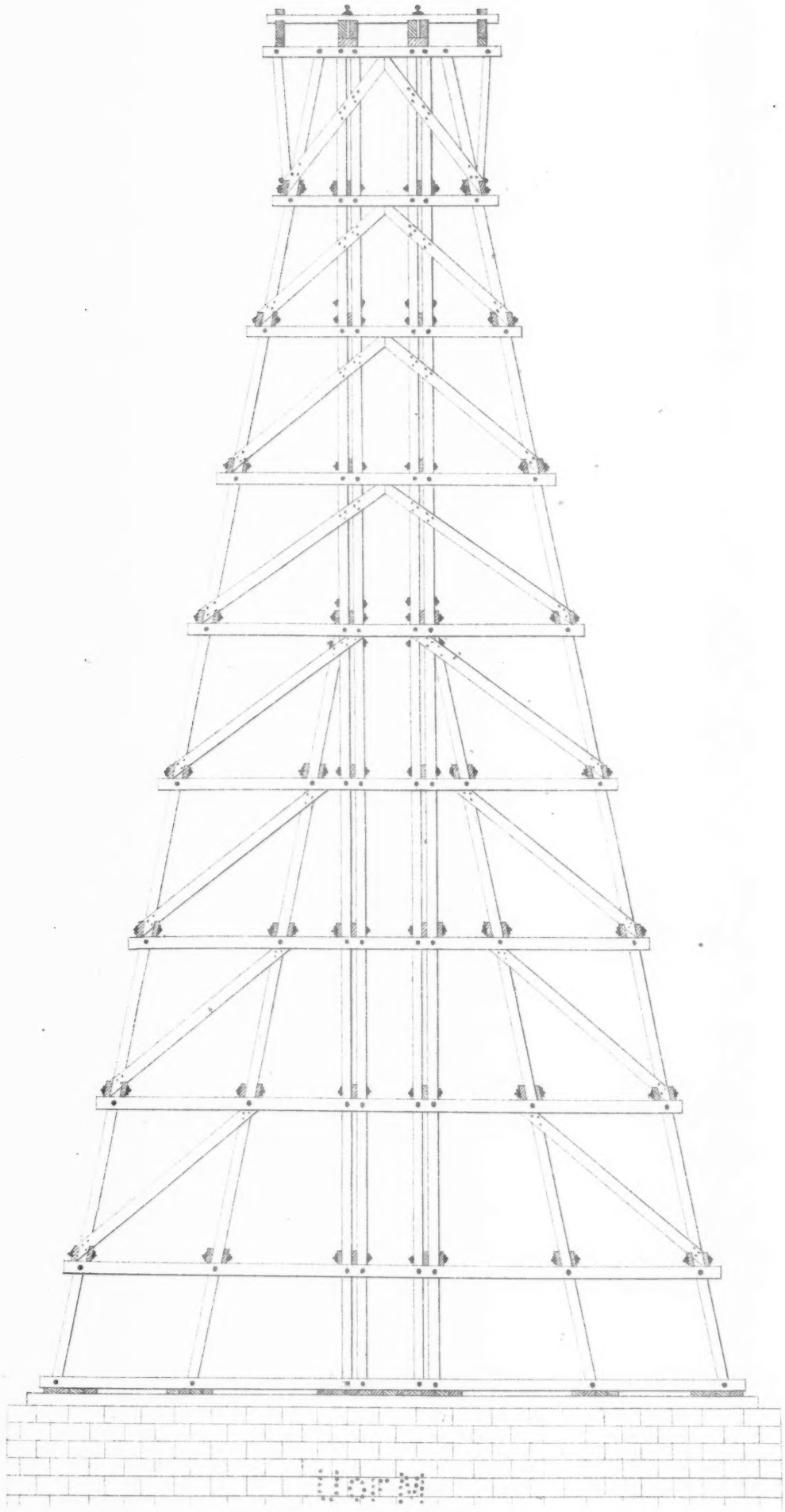
This company has lately reported that the sale of its bonds have amounted to $25,000,000, and if this is true it is difficult to see how it could have needed advances from its bankers (who are also virtually its owners, or were, according to the sworn statement of its President, sixteen months ago, when they held considerably more than one-half of the $4,500,000 stock, and were the only really large holders). Its completed lines consist of a line from a junction with the Lake Superior & Mississippi Railroad 24 miles west of Duluth westward 428 miles to the Missouri River at Bismarck, Dakota, and of a line in Washington Territory from the Columbia River at Kalama (about 35 miles below Portland) northward 105 miles to a port on Puget Sound. The latter is not completed, but the grading is all or nearly all done and the material is pretty much all on hand, so that it is likely to be completed within a few weeks. Sixty-five miles was completed last year. We believe that the company has a half interest in the 24 miles of the Lake Superior & Mississippi road between Thomson and Duluth, and counting that as twelve miles, when the Pacific Division contract is finished it will own 545 miles of road. For about 180 miles west of Duluth the country is almost worthless for agriculture, has scarcely any population, and is not likely to have. Thence to the Red River and for about ten miles west of it (about 80 miles) the country is fertile, and the Red River valley proper, which is about 40 miles wide, is very fertile and easily tillable. The climate is so severe that Indian corn and stock cannot be profitably raised; but the wheat crops, according to the few years' experience had up to this time, are almost certain, very productive, and of excellent quality, and with reasonably cheap transportation to Duluth wheat-growing there ought to be profitable. This district has recently received a considerable number of settlers, chiefly Scandinavians, but including some English colonies. The land grant of the company is enormous, being at the rate of 25,600 acres per mile in the territories, and 12,800 miles in Minnesota. There is comparatively little desirable land on its line in the territories, however, unless it may be pretty well to the east in Washington, the present line in that territory being through a wooded country, where timber, at some distance from water courses, will not be valuable for a long time. The fertile belt in Minnesota extends almost indefinitely north and south of the Northern Pacific, and in the latter direction a line of the St. Paul & Pacific, unconnected with the rest of its system, extends, which if completed and kept as a feeder of the Northern Pacific may in time bring it a considerable traffic. The Dakota section will hardly attract immigration until this country is much more crowded than it now is, and its earnings must be very small. Indeed, until the Red River valley has had time to grow, the road can hardly have much paying traffic, and must depend for income, as doubtless was intended, on its sales of lands. We do not know that any report of its land sales have been made. Probably not very high prices can be obtained for the best of them, but free sales at low prices would give the company a large income. The company's bonds have been received in payment of lands, and at a premium of 10 per cent., we believe. The only construction during 1873 has been that of the nearly completed 40 miles in Washington and the laying of track on about 25 miles east of the Missouri which storms, coming earlier than expected, prevented last fall.

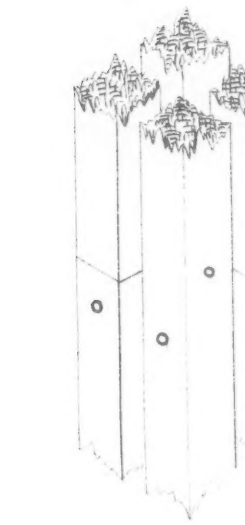
As to the effect of a suspension of the work caused by inability to sell more bonds, we do not see how it can be injurious, if the company is provided with means to pay a few coupons ahead. The sales have been at the rate of about $15,000 per mile, if it is true that $25,000,000 have been sold, and this ought to leave a large margin over cost of construction. Although an extension to Helena, Montana, would probably secure it all the traffic of that territory, yet that traffic is so small that it could not begin to pay the interest on the cost of the extension, and it is idle to expect a paying through traffic for the road so long as Oregon and Washington have so small a population (less together than half that of the city of St. Louis). The part of the line completed would in any case be the most productive part, and the growth of population and the sales of land on the line would hardly be promoted at all (except probably in a part of Montana) were the line now complete from Lake Superior to Puget Sound. So we conclude that in this case delay is not dangerous or injurious. The yearly interest payments, as the road stands now, would be at the rate of about $3,700 currency per mile. There is no possibility of earning that amount from traffic for a long time to come, but that probably was never expected. The sales of land and bonds are the resources, and the legitimate resources, of a road of this kind, for meeting these payments. What these are likely to be we can only guess at. For the year ending with August, 1872, the gross receipts on the 228 miles in Minnesota were a little less than half a million, but the road was not open all the year, and the receipts for July and August of that year were reported to the Minnesota Railroad Commissioner as $105,510 and $113,558 respectively. Up to the end of the latter month, too, the company had sold but 10,014 acres of land, having then, indeed, but just begun to sell.

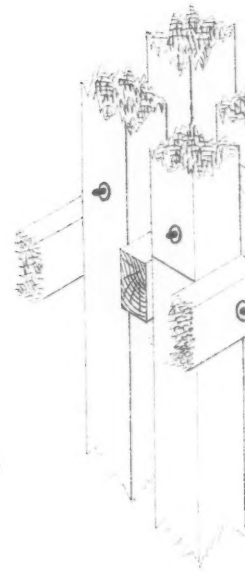
THE CHESAPEAKE & OHIO.

This road is in many respects unlike those we have described heretofore. About 200 miles of it, from Richmond to Covington, is not a new but an old road, and part of it very old, all having been in operation before the war as the Virginia Central Railroad. The present company has extended the line across the mountains to the Ohio River at Huntington, near the mouth of the Kanawha, 223 miles, through a difficult country, long settled but thinly peopled, with scarcely any industry other than farming and grazing. Though there is much fertile land in this rugged country, and exceptionally fine grazing, the country does not and is not likely to afford much traffic in agricultural products. The old road used to earn about $3,000 per mile, which left it a surplus after paying interest. Nor is a great through traffic to be expected from the territory west of Huntington, even when railroad connections are established, chiefly because this district south of the Ohio does not produce largely the articles which make a heavy traffic, while the district north of the Ohio finds its market for its products chiefly in the country north of the Chesapeake & Ohio line. Doubtless some such traffic will be had, but this resource is insignificant compared with the mineral resources of the line. Men are very liable to be mistaken in regard to the value of mineral deposits—and no opinion but that of experts is worth anything on the subject. But we have happened to hear the opinions of some mining engineers and metallurgists of the first rank, who have examined the country with some care, and are, further (and better), altogether disinterested, and they are unanimous in the opinion that the location, relative situation, quality and profusion of the coal and iron ore deposits must make a very large district on the line of this road the place where iron can be manufactured cheaper than anywhere else in this country, if not in the world, with the exception, perhaps, of a single district. The coal is so very abundant that the best lands are very cheap; it can usually be mined very cheaply; it is of a quality and strength which fits it for smelting without coking; and the coal, iron and limestone can be brought together with but little transportation, while the finished product can be cheaply moved to the great domestic markets, or to tide-water, when the happy day comes when we can export iron, and supply the rest of this continent, if not parts of Europe, as it is almost sure to come, and that, from present appearances, in no very long period, We need not say that the growth of a great iron industry on the line of this road must inevitably give it an enormous business. And this growth seems inevitable. Besides, the road may develop a traffic of some importance, eventually perhaps of great importance, in carrying coal both eastward and to the Ohio.

The future of this road, then, seems secure enough, but of course it cannot wait too long for its business to develop. If it were in a rich agricultural country it might have a satisfactory traffic to begin with, and even a great coal traffic can begin almost at once where there is a great market for coal near by. But an iron business does not grow up in a day in a new country; it takes time to open mines, construct blast furnaces, and collect forces of skilled workmen. The work has already begun, however; there have been considerable investments of English







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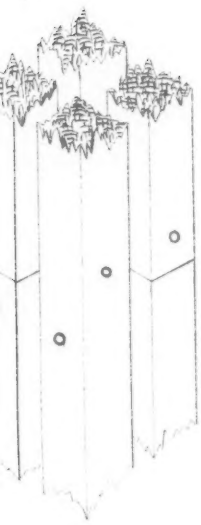
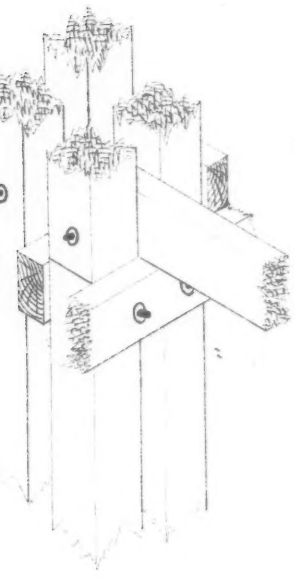
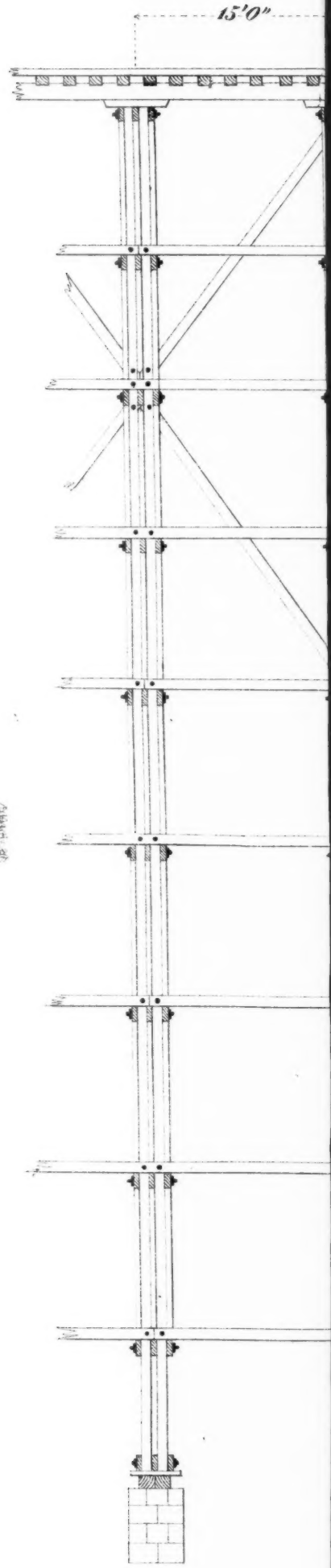
CLUSTER BENT FOR HIGH







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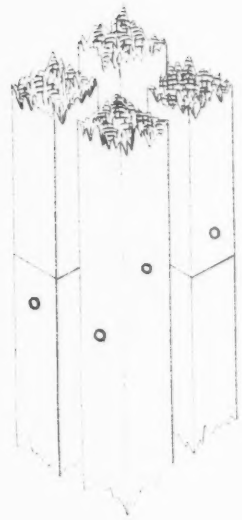
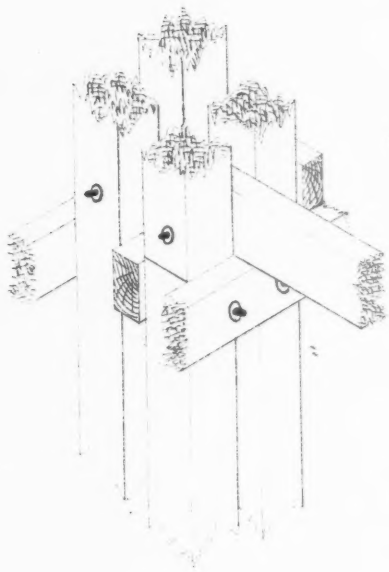
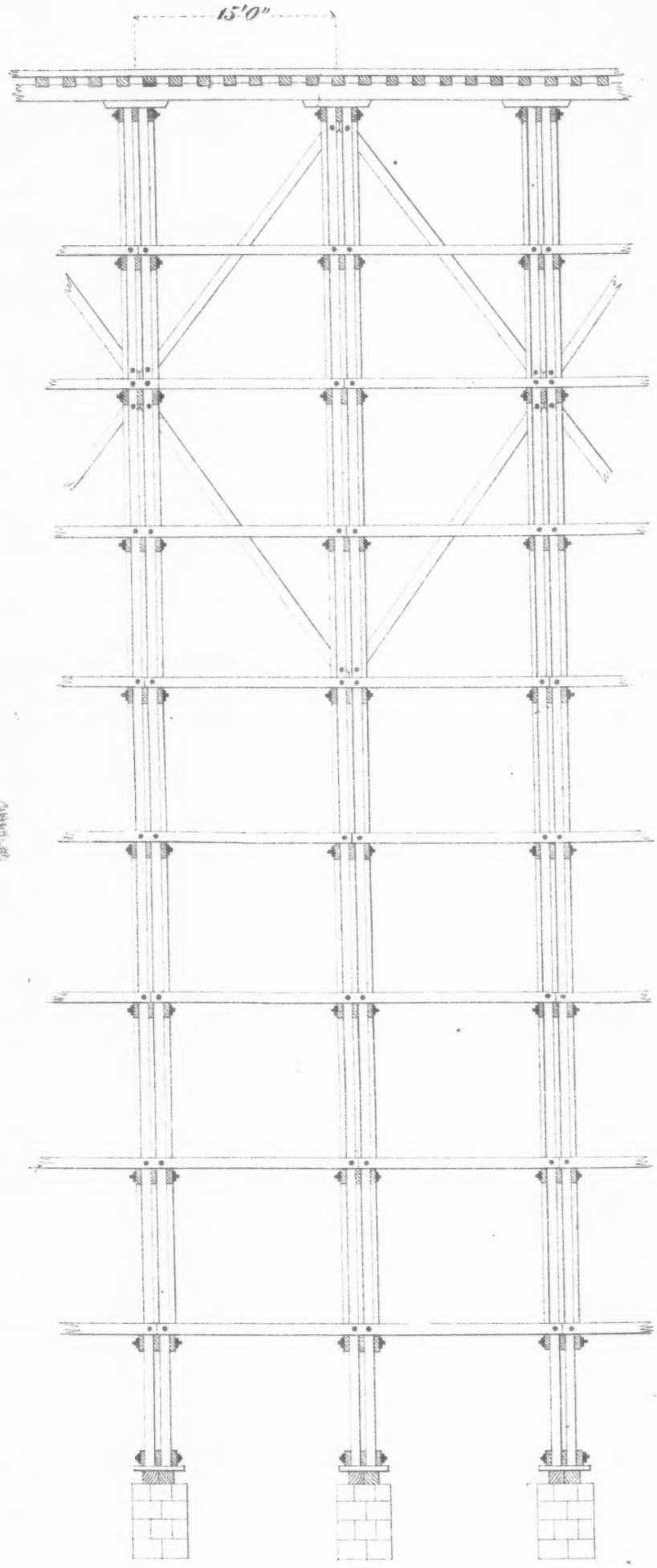
TOR HIGH TRESTLES.







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CLUSTER BENT FOR HIGH TRESTLES.

capital in mineral properties on the route, and the present high prices of iron and the limitation of production in England are giving a great impulse to the industry in this country. There seems every reason to believe that the mines on the Chesapeake & Ohio will be developed as fast as they well can be, and that when developed the road will have a very large and profitable business. It will be extremely unfortunate for the stockholders should they be compelled to give up the property in consequence of a loss of credit at this time, but the bondholders might accept with resignation a calamity which would give them the fee of the property mortgaged to them, even should they miss the payment of a few coupons.

The bonded debt of this company, at the date of the last report, was at the rate of about $42,000 per mile, most of it bearing 6 per cent. gold interest, which makes the interest charge about $2,800 per mile in currency annually, and it has been increased since that time, we believe. This is a large amount, the road having been a very costly one, crossing, as it does, all the ranges in the Appalachian chain. But a fairly developed mineral and iron traffic ought to make this burden a light one.

We have thus gone over the railroad lines which have been apparently most closely associated with the present financial crisis. Probably none of them, or only one, will need the proceeds of further securities in order to develop pretty fully their traffic, except for rolling stock and the payment of interest in some cases. We will not say that all of them will ever find a paying traffic, but doubtless the security of all the present issues of bonds will be very much increased in every or almost every case, if money is obtained to put the lines or parts of lines now laid in good condition and fully supply them with equipment for all the traffic that offers.

The Pennsylvania's London Loan.

English journals of the 6th contain the announcement of the offering in the London market of £2,000,000 of this company's 6 per cent. sterling, consolidated mortgage sinking-fund bonds, payable in 1905. The bonds were offered by the London, Asiatic & American Company, agents of the Pennsylvania Railroad Company, at the price of £180 per £200 bond, or 90 per cent., which, as they are sterling bonds, is equivalent to 90 in gold for the face of the bond, which will enable the company to realize just about par in currency for these gold bonds, and this is an excellent result, especially in times like these (or "those," perhaps we should say; for American securities are doubtless more discredited in London now than they were three weeks ago), for 6 per cent. bonds. And it is entirely proper that the securities of a road with immense existing and constantly increasing traffic, with a large surplus for dividends above the interest on its debt, should sell readily at high prices when the securities of new enterprises, which have little or no capital back of them, should be offered in vain at very low prices. And it is also true that scarcely any imaginable investment can be safer than that made to add to a railroad facilities for an addition to its traffic which is already offered. Much has been said of the decline in railroad construction in this country; but there is room, and long will be, for a great amount of new construction which will not increase the mileage of railroads, but go into second, third and fourth tracks, new sidings, terminal facilities and additions to equipment. Such loans as those lately negotiated for the Lake Shore & Michigan Southern, the New York Central & Hudson River, the Baltimore & Ohio, this of the Pennsylvania, and that which the Chicago & Alton is about to make have a very healthy look, being made, not to pay interest on expenses or even to retire old loans, but to supply facilities for a traffic which is already demanding them. There is likely to be more and more of such loans, as traffic increases, and fewer loans for entirely new lines; and the former are very unlikely to come to grief, as the latter not infrequently do. A hundred millions of such securities placed in Europe would very much improve our credit there; which is more than can be said of a great part of the paper we have sold there of late years.

Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information of the laying of track on new railroads as follows:

Boston, Barre & Gardner.—Extended from Gardner to Gardner West Village, Mass., 1 mile. *Chicago & Lake Huron.*—This line (late Peninsular) has been completed to its western terminus at Valparaiso, Ind., by the laying of three miles of track. *Texas & Pacific.*—The *Jefferson Division* has been extended northward 15 miles to Atlanta, Tex., and the *Transcontinental Division* from a point 10 miles east of Sherman, Tex., east 12 miles, in all 27 miles. *Chicago & Northwestern.*—The *Madison Extension* has been completed by the laying of track from a point 4 miles west of Elroy, Wis., westward 21 miles.

This is a total of 52 miles of new railroad, making the length completed in the United States in 1873 2,507½ miles.

American Loans in Europe.

The *Moniteur des Interets Materiels* of Brussels, in the course of an article on the issues of new securities during the first half of 1873, says:

"After Germany and Austria, which first called for attention, in consequence of the very crisis whose effects—pernicious or salutary, according as the financial world should be willing or unwilling to profit by them—we feeling that America attracts chief attention in the table of new issues. We have already had occasion to remark how much the American States, at all times and for all purposes, especially for their railroads, were soliciting the aid of old Europe, and we have maintained that in this there was a real danger which it was advisable to guard against. Sad examples have confirmed our judgment only too well. The Trans-continental Pacific, the Honduras, the Bolivian railroads are present to the recollection of all, as well as the ruin which they caused. And yet Europe none the less persists in its former errors. The first half of 1873 sees $400,000,000 of new American securities issued, chiefly shares and bonds of railroads, and shares in mines of all kinds. Doubtless the resources of America are multiplied, in great part yet undeveloped; utilized, they may largely remunerate the contribution of capital; but perhaps it would be prudent to accept with more hesitation enterprises so distant from us, whose course it is so difficult to control, and in whose direction and administration we could have no effective power."

The tables of loans published in the *Moniteur* gives the issues under three heads: loans of States and cities, credit establishments, and railroad and manufacturing companies. The American loans include $419,352,200 under the latter head, while all the rest of the world together solicited but $258,260,500 for the same purposes, and these American railroad loans (they are almost entirely for railroads and mines) are more than one-fourth of all the loans of the world for all purposes during the same time.

NEW PUBLICATIONS.

Mahan's Civil Engineering: Revised and Edited by Prof. De Volson Wood; pp. 513; John Wiley & Sons, New York.

American engineers will recognize an old friend in this work of the late Professor Mahan, although it is by no means a simple reprint of the former editions. Professor Wood has apparently overhauled the whole subject matter with much care, and modernized it so far as is possible in a descriptive work of this character. At best, such a work can be merely suggestive, and simply indicate the direction in which engineers have accomplished certain results, and in that sense is a useful and convenient book of reference. It is by no means a "Treatise on Civil Engineering," as impressed on the title page, any more than a volume of as many pages on "law" or "medicine" can be a treatise. It is most complete on the subject of mortars, cements, stones and the strength of materials, and very superficial on fixed constructions—a necessity growing out of the very fullness of the subject. Type forms can barely be described, and in iron work the meagreness in this particular is peculiarly noticeable. However, be this as it may, there is much valuable material scattered throughout the book, and Professor Wood has used a rare discretion in culling from the various reports, scientific papers and journals, such matter as would best elucidate the topic in hand. The researches of Grant and Reid in England, and the United States Goverment experiments in this country, are drawn from largely in the division under the head of Cements, while the experiments of Fairbairn and Kirkaldy, Barlow and Hodgkinson are carefully gleaned in all that relates to iron and steel, a department in which American experiments are strangely meagre and isolated. The subject of masonry and foundations has been extended to include the use of compressed air and screw piles, and well-condensed descriptions are given of the pneumatic cylinders of the Harlem and Omaha bridges, and the great caissons of the East River and St. Louis bridges. Shaw's gunpowder pile-driver is introduced as the most recent novelty in piling, and a description is given of the mode of protecting piles under the Cushing system, as illustrated in the piers of the Seekonk River bridge. The subject of stone arches appears to be a reprint entire from the old edition, in which two pages only are devoted to oblique arches with winding beds, a form of construction that perhaps has but one example of any magnitude in this country—on the Lake Shore road near Buffalo. The customary American mode of making a "skew," by stepping back, as it were, narrow sections of right arches, is not mentioned at all. It is rarely, however, that the engineers of this generation are called upon to build a stone arch beyond the dignity of a good-sized culvert, so that the importance of such constructions is not so pressing as it was twenty years back.

Under the division of "Bridges," many familiar illustrations will be noted, having done duty in more than one work on engineering. The illustration of the Howe truss perpetrates the same error the old edition had, in that it shows *three* cancellations of the web system, and is probably printed from the old block.

The Burr bridge, so familiar to Pennsylvanians, and the McCallum truss, which has ended its days on the Erie Railway, the location also of its birth, together with a standard wooden road bridge used on the line of the Erie Canal, are the additions to "wood framing." Among *iron* bridges the most important new matter added relates to truss bridges, and those designed by Mr. Linville and Mr. Post are given as "types" of construction—about as strong a contrast as could be well made—the former being neat and pleasing in design, while the latter is about as awkward and ungainly a frame as one meets. Whipple's trapezoidal and arch truss bridges are also illustrated—two trusses that are the parents of a numerous brood. The great Louisville bridge is given in illustration of the Fink truss, in which an error is made when the great channel span and draw span are credited with this form. These spans are Warren girders, modified by Mr. Fink, and unlike, in every particular, the truss popularly associated with his name, the skeleton of which is given by Professor Wood. Further illustration is given of American work in the Bollman truss, the lattice girder bridge over the Alleghany River at Pittsburgh, and the great steel arch of Captain Eads at St. Louis. The editor has wisely condensed the article on tubular bridges, of which the world has received all that it is ever likely to get. A condensed description of the proposed East River suspension bridge, and an illustrated one of the Roebling bridge at Niagara are added matter under the proper heading. The article on "Swing Bridges," slim to disappointment, contains a redeeming feature in the illustrated description of the fine draw at Providence, even to the table of strains, covering over two pages—room that might have wisely been given to other "descriptive information." The most complete description and illustration upon "Roof Construction" relates to the dome and trusses over the large hall of the University of Michigan, a construction designed and superintended by the editor. This framing contains many novel features, and is worthy of careful study. The analysis is given by Prof. Wood in his recently published 'Bridges and Roofs."

The illustration, retained from the old edition, of the iron roof of the "New Parliament Houses" might as well have had some good American work introduced in its place, as it is probble that no one, in this country at least, will take that roof as a model. The principal addition to the article upon "Railways" consists in a well-arranged synopsis of the experiment of Baron Von Weber, made some two years since, upon permanent way fastenings, as well as those of Herr Funk upon the holding power of spikes. A few final pages at the end of the book are devoted to "Canals," "Rivers and "Sea-coast Improvements."

Like every other book endeavoring to compass within the covers of a single volume a description of processes and methods employed throughout the whole range of "Civil Engineering," it can but skim over the surface, a fact that the editor must have realized thoroughly when selecting from the great mass of material that modern experience has accumulated, pressing for admission, thus rendering his task no easy one.

Apart from the shortcomings incident to all works of this class, the volume before us has an intrinsic value in its suggestiveness, and will be useful for reference, more especially for students in our technical schools. While it has been well and carefully edited, in its mechanical features it cannot be regarded as a very flattering specimen of American work, particularly to eyes that are familiar to such pages as come from English, French or German publishers.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

—Mr. L. Pearson, late Superintendent of the Evansville & Crawfordsville Railroad, has been appointed General Superintendent of the Chicago, Danville & Vincennes.

—Mr. J. W. Watson, Assistant Superintendent of the Buffalo, New York & Philadelphia Railroad, will hereafter, in addition to his present duties, have charge of the telegraph on the road, in place of Mr. P. W. Bossart, who has resigned his position as Superintendent of Telegraph.

—Mr. John Crampton was appointed General Freight and Passenger Agent of the Great Western Railway, September 15. His office is at Hamilton, Ontario. Mr. Crampton has hitherto been General Freight Agent of the road, with office at Detroit.

—Mr. Walter G. Bronson has been appointed Train Dispatcher at Jersey City on the Erie Railway, in place of H. S. Henderson, resigned. Mr. M. Staples has been appointed Depot Master at Jersey City, in place of T. Onderdonk, resigned.

—Mr. C. O. Wilson, formerly connected with the New Jersey Southern, has been appointed Superintendent of the New York, Boston & Montreal Railroad.

—An order from General A. E. Burnside, President of the Cairo & Vincennes Railroad Company, appoints Roswell Miller Superintendent of the road, in place of Major John Lee, resigned. Mr. Miller has appointed Mr. L. W. Palmer Assistant Superintendent. The right of the President to remove Major Lee is contested by that gentleman and by Gen. E. F. Winslow, the General Manager.

—At the annual meeting of the Indianapolis, Bloomington & Western Railway Company, recently, the following directors were chosen: C. R. Griggs, C. H. Smith, Urbana, Ill.; W. Y. McCord, Mount Pleasant, Ill.; H. Conklin, Bloomington, Ill.; D. T. Thompson, Pekin, Ill.; L. J. Bond, Monticello, Ill.; George Nebeker, Covington, Ind.; S. C. Wilson, Crawfordsville, Ind.; Dillard Ricketts, Indianapolis, Ind.; B. E. Smith, William Denison, Columbus, O.; W. W. Phelps, Englewood, N. J.; Robert Turner, New York. The board re-elected the old officers, as follows: President, B. E. Smith; Vice-President, C. R. Griggs; Secretary and Treasurer, A. P. Lewis, Urbana, Ill.

—The Maryland & Pennsylvania Railroad Company has elected the following board of directors: L. Montgomery Bond, J. B. Alexander, Wm. J. Pollock, George W. McPherson, Philadelphia; J. Morrison Harris, Job Haines, B. C. Reynolds, of Maryland. The directors elected officers as follows: President, L. Montgomery Bond; Vice-President, Job Haines; Chief Engineer, J. M. Hood.

—Major Crandall has been elected President of the Illinois, Missouri & Texas (formerly the Cape Girardeau & State Line) Railroad Company.

—The officers of the Parker & Karns City Railroad Company are as follows: President, S. D. Karns; Secretary and Treasurer, W. C. Mobley; Superintendent, Charles P. Badger.

—At the annual meeting of the Norfolk Railway Company in Simcoe, Ont., recently, Mr. Wilkes was chosen President, and Messrs. Wilkes, Watts and Imlach, of Brantford, Ont.; Law, of Tilsonburg, Ont., and Carrol, of Norwich, Ont., directors.

—Mr. E. G. Squires has been appointed Chief Train Dispatcher at Burlington, Ia., on the Burlington & Missouri River Railroad, in place of W. J. Elgar, who has been made Chief Operator.

—The following officers of the Monticello & Port Jervis Railroad Company have been re-elected for the ensuing year: President, S. O. Dimmick; Vice-President, T. A. Niven; Treasurer, George Malven; Secretary, F. Marvin; Attorney, C. V. R. Luddington; General Superintendent, M. V. Hiller.

—Mr. Abram S. Hewitt, Receiver of the New York & Oswego Midland Railroad Company, has reappointed Mr. C. W. Douglas General Superintendent of the road.

—Mr. David Edwards has been appointed Superintendent of the Toledo, Canada Southern & Detroit Railway.

—At the annual meeting of the Toronto, Grey & Bruce Railway Company in Toronto, Ont., September 10, the following board of directors was elected: John Gordon, John Baxter, B. H. Dixon, Thomas Dick, John Morison, William Ramsey, Thomas H. Lee, William M. Clark, William B. Hamilton, Toronto, Ont. Messrs. G. A. Barber and Samuel Spreull were chosen Auditors of accounts for the ensuing year. The board subsequently re-elected John Gordon President, and elected William Ramsey Vice-President.

—Mr. A. H. de Clercq, late Master Mechanic of the Toledo, Peoria & Warsaw Railway, has been appointed Master Mechanic of the International & Great Northern Railroad of Texas.

—The Belvidere & Ottawa Railroad Company was organized at De Kalb, Ill., Sept. 20, by the election of the following officers: President, Marcellus G. Leonard, Belvidere, Ill.; Secretary, William H. Ricord; Treasurer, E. P. Young; Chief Engineer, George H. Huribut.

PERSONAL.

—Mr. Ezra Foster, Jr., for many years connected with the New York Central & Hudson River road, and at one time Assistant Superintendent, died at Albany, N. Y., September 18.

—Mr. John Hawkshaw, an eminent English engineer, has been knighted in recoguition of his engineering skill. Sir John Hawkshaw was manager of the Bolivar copper mines, in South

America, at the age of 20, and afterward constructed in England the Manchester & Bolton, and the Lancashire & Yorkshire railroads, and other lines in Russia, Mauritius and India. He is now engaged on the extension of the East London Railway, from Wapping to Liverpool street, under the London Docks.

—Mr. Paul W. Bossart, Superintendent of Telegraph on the Buffalo, New York & Philadelphia Railroad, has resigned to accept a similar position on a Southern road.

CHICAGO RAILROAD NEWS.

Chicago & Northwestern.

The event of the week in railroading has been the official opening of the Winona & St. Peter Railroad (owned by the Chicago & Northwestern) to its terminus in Dakota Territory at Lake Kampeska, a total distance of 631 miles from Chicago over the Northwestern's lines. A large number of business men and railroad officials left the city in four Pullman palace cars September 15, and returned on the 19th. The party consisted of about 100 invited guests, who were provided with the best of quarters and the best fare. The route taken was over the Wisconsin Division to Harvard, thence, on the Kenosha & Rockford Division, to Caledonia, at which point the Madison Division is reached; this division connects near La Crosse with the La Crosse, Trempealeau & Prescott Railroad (owned by the Northwestern), which terminates at a point on the Mississippi opposite Winona; and at Winona begins the Winona & St, Peter road, nearly all of whose stock the Chicago & Northwestern owns.

The excursionists were among the first to pass through the three long tunnels which connect the Baraboo, Chickapoo and La Crosse valleys respectively. These tunnels have cost the company just about half a million dollars. At Kampeska Lake, which was reached on Wednesday, the excursionists held a meeting and made speeches. A series of resolutions expressing the warmest thanks of the party was adopted on the homeward ride. The public lands which the Northwestern Company now own amount to about two million acres, and must soon become a source of large revenue as they are some of the best lands of Minnesota and Dakota. The tide of immigration is rapidly pouring westword along the new line of road and must shortly settle and cultivate what is now little else than a howling wilderness.

The following is a list of stations and distances from Chicago to the Dakota terminus:

Stations	Distance from Chicago.	Stations.	Distance from Chicago.
Chicago		West Salem	261
Montrose	8	Winona Junction	269
Desplaines	17	Onalaska	271
Dunton	22	Midway	275
Palatine	2[illegible]	Lytles	280
Barrington	32	Trempelean	286
Cary	38	Pine Creek	293
Crystal Lake	43	Bluff Siding	297
Woodstock	51	Winona	299
Harvard Junction	63	Minnesota City*	312
Capron	69	Stockton	317
Poplar Grove	74	Lewiston	325
Caledonia	78	Utica	3[illegible]8
Roscoe	85	St. Charles	334
Beloit	91	Dover	338
Afton	98	Eyota	343
Hanover	103	Chester	350
Footville	107	Rochester	356
Magnolia	111	Byron	365
Evansville	116	Kas-on	371
Brooklyn	122	Dodge Center	377
Oregon	128	Claremont	384
Syene	133	Havana	391
Madison	138	Owatonna	396
Westport	143	Meriden	405
Waunakee	148	Waseca	411
Dane	153	Janesville	422
Lodi	158	Eagle Lake	430
Merrimac	165	Mankato	441
Devil Lake	169	Kasoto	443
Baraboo	173	St. Peter	446
Blooms	181	Oshwa	456
Ableman's	184	Nicolet	460
Reedsburg	191	New Ulm	476
La Valle	19[illegible]	Sleepy Eye Lake	489
Wonewoc	205	Burns	504
Union Center	209	Cottonwood	5[illegible]4
Elroy	212	Walnut Grove	529
Glendale	21[illegible]	Saratoga	541
Wilton	227	Marshall	554
Dover	233	Lac qui-parle	582
Sparta	24[illegible]	State Line	593
Herseyville	250	Ocean Siding	603
Fish Creek	253	Prairie Siding	616
Bangor	257	Lake Kampeska	631

* There must be some error here. Minnesota City is 6 and not 13 miles from Winona, and the difference is continued in all subsequent distances.

The part of this line west of New Ulm, which is 155 miles long, was begun in 1872, and was reported completed to the Dakota line, 117 miles, at the close of that year; but the contractors were overtaken by terrible storms early in the winter, and a large part of the work must have been very imperfectly done. The length of the line in Dakota, which was begun this year, is 38 miles. The route is nearly due west from Winona to Mankato Junction, 142 miles, thence north about 12 miles to a point above St. Peter, thence west about 75 miles, and thence nearly due northwest to Lake Kampeska, 107 miles, nearly parallel with and distant about 30 miles southwest from the Minnesota or St. Peter River. The entire length of the Winona & St. Peter proper is thus 332 miles, according to this table, which, as we have noted, gives 7 miles more than previous tables as the distance between Winona and Minnesota City.

The company sell tickets only to New Ulm at present, although considerable numbers of immigrants are settling along the line even beyond this point.

The Effect of the Panic.

There is little fear that Western railroad stocks which have depreciated during the late panic in New York will permanently be depressed. The country is full of grain and pork, and prices are rising so that generally the railroad companies centering in this city regard the financial flurry as of no special consequence here, and it is the general opinion among railroad men and bankers that it will not effect the We t otherwise than to make a temporary tight money market. The roads are all very busy here, having work for all their cars, no matter how rapidly the wheels are made to turn.

TRAFFIC AND EARNINGS.

—The earnings of the Burlington, Cedar Rapids & Minnesota Railway for the first week in September were: 1863, $33,129; 1872, $24,002; increase, $9,127, or 38 per cent.

—The earnings of the Indianapolis, Bloomington & Western Railway for the first week in September were: 1873, $38,715; 1872, $28,858; increase, $9,857, or 34½ per cent.

—The earnings of the Milwaukee & St. Paul Railway for the second week in September were: 1873, $277,620; 1872, $187,018; increase, $90,602, or 48½ per cent.

—The earnings of the Erie Railway for the first week in September were: 1873, $428,303; 1872, $405,706; increase, $22,597, or 5 9-16 per cent.

The earnings of the Denver & Rio Grande Railway (main line) for the first week in September were: 1873, $8,966; 1872, $7,468; increase, $1,498, or 20 per cent.

—The earnings of the St. Louis & Southeastern Railway for the second week in September were: 1873, St. Louis Division, $20,565.59; Nashville Division, $8,682.55; total, $29,248.14; 1872, total, $21,394; increase, $7,854.14, or 36¾ per cent.

—The earnings of the Chicago & Northwestern Railway for the second week in September were: 1873, $371,145; 1872, $295,830; increase, $75,315, or 25½ per cent.

—The earnings and expenses of the Union Pacific Railroad for the month of July were as follows:

	1873.	1872.	Increase.	P. ct.
Earnings	$876,833	$743,382	$133.451	18
Expenses	457,182	357,840	79,342	22⅛
Net earnings	$439,651	$385,542	$54,109	14⅛

For the seven months endings July 31 the earnings and expenses were as follows:

	1873.	1872.	Increase.	P. ct.
Earnings	$5,459,809	$4,584,999	$874.810	19⅛
Expenses	2,790,.96	2,744.977	45.179	1⅝
Net earnings	$2,069,713	$1,840,022	$829,691	45¼

The expenses in 1873 were 51½ per cent. of earnings, and in 1872 59½ per cent. The earnings per mile in 1873 were $5,285, and in 1872, $4,439.

—The earnings of the Erie Railway Company for the second week in September were: 1873, $526,778; 1872, $473,324; increase, $53,454, or 11¼ per cent.

OLD AND NEW ROADS.

The Boston & Maine and Maine Central Controversy.

The connection between the Boston & Maine and Grand Trunk roads at Portland, Me., has finally been made. The rails of the Boston & Maine road were laid down across the Eastern track to Smith's wharf, where the connection with the Grand Trunk is made, September 23. On the afternoon of that day freight cars were transferred from the Boston & Maine to the Grand Trunk.

New York & Long Branch.

In the case of the Pennsylvania Railroad Company against the New York & Long Branch Railroad Company, the United States Circuit Court at Trenton, N. J., gave its decision September 23. The motion for an injunction to prevent the building of the bridge across the Raritan at Perth Amboy is denied, with costs. The court affirms the right of the New York & Long Branch Company to build the bridge under the charter from the State of New Jersey.

East St. Louis Stock Yards.

The extensive new yards at East St. Louis, known as the National Stock Yards are nearly completed and will be formally opened October 2.

Ware River.

Five construction trains and a large force of men are at work on the extension of this road to Winchend n. The new track which is being laid from the present southern terminus of the road at Palmer to a connection with the Boston & Albany track is nearly completed. The connection at Palmer has heretofore been with the New London Northern road.

Intercolonial.

A telegram announces that the Canadian Minister of Finance has succeeded in placing on the London market a 5 per cent. loan of £2,000,000 sterling for the Intercolonial Railway. The bids amounted to £4,000,000, and the average premium was 4½ per cent. Interest on this issue of bonds is to commence October 1. The loan is not made to a company, but to the Dominion of Canada, which is constructing the Intercolonial Railway as a government work.

The Rogers Locomotive Works.

The working force at the Rogers Locomotive Works at Paterson, N. J., has been reduced by the discharge of 585 men, or about one-third of the force, September 23. The reduction is made in consequence of the canceling of some orders and anticipated delay in filling others, owing to the embarrassment to railroad companies caused by the recent financial troubles. No reduction has been made by the other Paterson shops.

Southern Maryland.

The President of this company denies the rumors that the work of construction on the road was to be suspended. He states that the grading is being pushed rapidly forward, and that there is no intention of suspending it until the road is completed.

New York & Washington.

By the present arrangement of through trains between New York and Washington, three trains are run through by way of the Baltimore & Potomac road, leaving New York at 9 a. m., 3 and 9 p. m. One train, leaving New York at 7:30 p. m., runs through by way of the Baltimore & Ohio road.

Putnam & Stafford.

The corporators of this company met at South Woodstock, Conn., September 13, and made arrangements for opening books for subscriptions to the stock. The road is to extend from Putnam, Conn., on the New York & New England road west by north to Stafford on the New London Northern. It will be about 25 miles long, and may possibly form a link in the Providence & Springfield line.

Cincinnati & Terre Haute.

An effort is to be made to put this road into the hands of a receiver. The road is completed from Terre Haute, Ind., southeast to Middlebury, 27 miles, and some grading is done beyond that point, but the work has been suspended for some time. It was lately said to have been leased to the Terre Haute & Southwestern Company, whose own road is hardly begun.

Hoosac Tunnel.

During the first week in September the headings were advanced 50 feet from the central shaft, and 33 feet from the west end. The contractors have offered the men $2 per foot for all advance over 125 feet per month from each end.

European Prices of Bonds.

Quotations August 30 at Frankfort were: United States 5-20s of 1867, 99⅞; Buffalo, New York & Philadelphia 7s, 59 7-16; Cairo & Vincennes 7s, 66⅔; Central Pacific 6s, 82¾; Chicago, Burlington & Quincy 4½s, 69¾; Chicago & Southwestern 7s, 71¼; Grand Rapids & Indiana 7s, 92; Kansas Pacific 7s, 75½; Missouri Pacific 6s, 69¼; South Pacific 6s, 62¾; Mobile & Ohio 7s, 82¼; New York & Oswego Midland 7s, 64½; Oregon & California 7s, 18¾; Rockford, Rock Island & St. Louis 3½s, 27½. At Berlin the following additional quotations are given: Alabama & Chattanooga 8s, 37½; Brunswick & Albany 6s (guaranteed by State of Georgia), 15; Peninsular 7s, 40; Port Royal 7s, 43; St. Louis & Southeastern 7s, 53½. And at Amsterdam the following: Maxwell Land Grant and Railway 7s, 33½: Winona & St. Peter 7s, 82½; St. Paul & Pacific, second section, 26; St. Paul & Pacific of 1869, 30; St. Paul & Pacific, St. Vincent and Brainerd extensions, 25¾; Marietta & Pittsburgh 7s, 58; Atlantic, Mississippi & Ohio 7s, 51½: Missouri, Kansas & Texas 7s, 70; Cairo & St. Louis, 70¼.

Brunswick & Albany.

The sale of this road which is to be made by order of a Georgia court on the 15th of October is not a forclosure sale to satisfy the bondholders, who for some time have received no interest, but simply to satisfy a claim of $150,000 against the road. This claim, we believe, is in the nature of a mechanic's lien, and is prior to the mortgage, so that the buyer will hold against the bondholders. Most of the bonds are held in Germany, and there is a movement toward raising among the holders the sum of $150,000 in order to satisfy this claim and leave their claims unimpaired. The road is one of the poorest properties in the United States, probably, but the iron on it must be worth something like $8,000 per mile, and it is course worth saving.

Northern Pacific.

A part of the cavalry escort, together with the engineers engaged in surveying the route along the Yellowstone, reached the stockade on the Yellowstone September 4, and reports the route fixed upon to be along the southeast bank of the Yellowstone from Powder River as far west as Tongue River, there crossing and following the north bank to the Big Porcupine, where it crosses the divide in a northwesterly direction near the great bend of the Musselshell, and follows up that stream nearly due west to a connection with the line surveyed by the Barker party last year. They report the country, with the exception of the valleys of the Yellowstone and Musselshell (which are narrow) an uninhabitable desert.

This diversion from the Yellowstone to the Musselshell is made about 75 miles above the mouth of Powder River, and brings 150 miles or more of the road nearly parallel to and nearly 50 north of the Yellowstone, and directs the line straight toward Helena.

Central Pacific.

The company has discharged 285 men from the Sacramento shops since the recent election in California.

Boston, Barre & Gardner.

A correspondent informs us that track laying has been commenced on the extension of this road from Gardner, Mass., to Winchendon. One mile of track has already been laid and trains are now running over it to Gardner West Village. The iron and ties for the extension are being received and it is expected that the road will be completed to Winchendon, nine miles beyond Gardner, in a few weeks. The business of the road has increased considerably during this season. The company now owns five locomotives, 2 baggage, 6 passenger, 40 box, 20 flat and 20 dump cars.

New Jersey West Line.

It is reported that Mr. Asa Packer is buying up the stock of this company, which would seem to be a needless expense on his part, as the stockholders are now only too willing to give him control, provided he will complete the road. A large part of the stock is owned by the towns along the line. The road is completed from Summit, N. J., on the Morris & Essex, westward 16 miles to Bernardsville, and nearly all the grading is done from Summit eastward to the Pennsylvania at Waverley. The company owns a tract of 60 acres of land under water adjoining the New Jersey Central docks at Communipaw, which it purchased of the State for $125,000.

Should Mr. Packer again take hold of the road, it would probably be extended westward, not to the Delaware, according to the original intention, but only to a connection with the Easton & Amboy road.

New York, Providence & Boston.

The stockholders are notified that the remaining installment of 80 per cent. on the new stock subscribed for will be due and payable October 1. All the new stock not subscribed for under the circular issued May 17 was to be sold at auction in New York, September 24.

Springfield & Illinois Southeastern.

On the night of September 17, the walls of the repair shop now being erected at Pana, Ill., were blown down by the wind. The loss is estimated at $12,000.

St. Paul & Sioux City.

The machine shops of this company at Shakopee, Minn., took fire on the night of September 12. The brass foundry was destroyed, but the employees succeeded in saving the main shops.

Galveston, Harrisburg & San Antonio.

The County Court of Galveston, Texas, has ordered a special election to be held October 17, on the question of issuing $250,000 in bonds in aid of this company. The bonds to be paid the company provided the road is completed to San Antonio in 16 months from the time of voting, and the company to give its bonds in the amount of $50,000, to be forfeited if the road is not completed within the specified time.

Providence & Springfield.

This company has commenced work on its new track from Olneyville into the city of Providence, a distance of about two miles. It now uses the track of the Hartford, Providence & Fishkill road from Olneyville.

Burlington & Southwestern.

Arrangements have been made for the consolidation with this company of the Lexington, Lake & Gulf Railroad Company. The latter company purposes building a railroad from Lexington, Mo., southward to the Southern boundary of the State, but has never, we believe, done any work on the road. The line to be built under its charter will form an extension of the Burlington & Southwestern's Lexington Branch.

The difficulty between this company and the St. Louis, Kansas City & Northern as to the use of the latter's track between Bloomfield and Moulton has been adjusted, and the Burlington & Southwestern trains now run through from Burlington to Unionville, Mo., as heretofore.

Chicago & Lake Huron.

The track is now laid to Valparaiso, Ind., on the Pittsburgh, Fort Wayne & Chicago. The new track from South Bend to Valparaiso is being leveled up and put in good order for the running of trains. It is expected that regular trains will run through to Chicago, October 1, running on the Pittsburgh, Fort Wayne & Chicago from Valparaiso to Chicago.

The company has recorded a mortgage of $12,000,000 on the consolidated road. The mortgage is to the Union Trust Company of New York as trustee, and bears date August 1, 1873.

Waterloo, Belle Plaine & North Missouri.

The contract for 50 miles of this road, from Cedar Falls, Ia., on the Iowa Division of the Illinois Central, southward to Belle Plaine, on the Chicago & Northwestern, has been let to P. K. Hayden.

Albert County.

Albert County, New Brunswick, has voted an additional bonus of $30,000 to this company. The county had previously voted $40,000, so that the total bonus from the county is now $70,000, which, with the grant of $350,000 made by the New Brunswick government, makes $420,000, for which sum the contractors will undertake to build the road. It will be 30 miles long, from

the Intercolonial Railway southeast to Hopewell, on the Bay of Fundy.

New Haven, Middletown & Willimantic.

The trustees for the bondholders who are now in possession of the road propose to apply the receipts first to putting the road into good condition, building depots and doing other necessary work, and second to pay the interest on the bonds. The bonded debt is $5,000,000.

Kansas City, Memphis & Mobile.

The General Superintendent of this projected road informs us that the company expects to have the road graded this season for about 100 miles southwest from Kansas City, Mo. Work is now going on on a tunnel near Kansas City. The road is to extend from Kansas City southwest through Missouri and Arkansas to Memphis, Tenn. It is stated that the line will furnish transportation for an extensive coal region, in addition to the local business which may be expected from the country through which it is to pass.

Midland Pacific.

Merrick County, Nebraska, has voted to issue $125,000 in bonds in aid of this company, on condition that the road is extended from the present terminus at Seward, Neb., to Lone Tree, on the Union Pacific (about 50 miles) by January 1, 1875. It is also provided that the bridge to be built across the Platte River at Prairie Island shall be a highway as well as a railroad bridge.

Manhattan & Northwestern.

The grading is completed from Manhattan, Kan., to the north line of Riley County. From that point to the junction with the Central Branch, Union Pacific, a distance of three miles, the work is being located and laid out for the contractors.

International & Great Northern.

Preparations are being made for the building of extensive repair shops at Palestine, Texas.

Chesapeake & Ohio.

The freight business of the road is increasing very rapidly, and there is some embarrassment from the want of sufficient rolling stock. Large quantities of lumber are now being carried over the road to Richmond and shipped thence by water.

Erie & Genesee Valley.

It is said that all the arrangements have been made for the extension of this road from its present southern terminus at Dansville, N. Y., southward 14 miles to Burns' Station, on the main line of the Erie, eight miles northwest of Hornellsville. The road, which is leased and operated by the Erie Company, is now 30 miles long and extends from Avon, on the Rochester Division, south by west to Mount Morris and thence southeast to Dansville.

Railroad Taxation in Missouri.

The following companies have made returns of their taxable property to the State Auditor of Missouri:

The St. Louis, Kansas City & Northern reports its roadway and bridges at $1,985,562.50; equipment, $1,219,120.00; other property, $446 925.68; total, $3,651,608.18.

The Missouri, Kansas & Texas reports right of way, $34,588; superstructure, $1,426,900; equipment, $300,260; total, $1,761,748.

The Kansas City, St. Joseph & Council Bluffs reports its total valuation in Missouri at $1,364,648; the Louisiana & Missouri River, $478,580; Quincy, Missouri & Pacific, $460,445.

Carondelet Bridge.

The St. Clair & Carondelet Bridge Company and the Carondelet Bridge Company have effected an agreement of consolidation and have filed the necessary papers. The consolidated company purposes building a bridge over the Mississippi at Carondelet, about six miles below the business center of St. Louis.

Indiana & Illinois Central.

Arrangements are being made for the extension of this road from its present eastern terminus at Montezuma, Ind., on the Wabash River, eastward 48 miles to Danville. From Danville to Indianapolis, 19 miles, it is proposed to use the track of the Indianapolis & St. Louis road.

Title to Railroad Lands in Missouri.

A test case was recently tried in the United States Circuit Court in St. Louis, involving the title to lands granted to the old Cairo & Fulton Railroad Company, and sold at the time of the foreclosure of the mortgage on that road by the State of Missouri. The plaintiffs in the case claim that the State lien covered only the road and its appurtenances, and did not include the land grant. The court, however, decided that the lien covered all the property of the company, including the land, and that the sale of the land under the foreclosure was valid. This decision covers a large number of cases.

Portland & Ogdensburg—Vermont Division.

The Montpelier (Vt.) *Argus* says that the negotiations for the lease of the Lamoille Valley road to the Central Vermont Company have not been abandoned, and that it is still possible the lease may be made, especially as the company has some difficulty in raising the money for the completion of the road. A portion of the directors, at least, are, it is claimed, in favor of the lease. One of the conditions of the proposed lease is that the road shall not be built through to Swanton, but shall be turned due west from Cambridge and built thence to a connection with the Vermont Central at Georgia, 10 miles south of St. Albans.

The Central Vermont Company doubtless desires to lease the road mainly in order to prevent the construction of this northern section from Cambridge to Swanton, which would interfere with the traffic of its own lines.

Illinois & St. Louis Bridge.

The connecting tubes of the first arch have been successfully placed in position. The St. Louis *Republican* of September 17, says:

"At present the weight of the superstructure is supported by the cables, and while that is the case the expansion and contraction of the tubes by heat and cold is of no consequence, but when it comes to putting in the last tubes, expansion and contraction cut a pretty big figure. When the connection is once made and the supports removed, so that the arch is self-sustaining, a new element comes into care—the contraction from pressure. When the cables are slackened, the arch at the center will from this cause settle about three inches. Provision has been made for this by increased length in the tubes, all the calculations being based on a temperature of sixty degrees. At that temperature it is known to the sixtieth of an inch what would be the intervening space between the approaching tubes, and the last joints have been dimensioned accordingly. Only once, since the workmen have been ready to put in these last tubes, has the temperature been favorable. On Sunday morning at 5 o'clock the conditions were all right, but owing to some unexpected tardiness the workmen did not get there till eight. One tube was put in and it fitted to a nicety. In the meantime the sun shone on the bridge, and when they came to put in the other tube it would not go entirely to its place, being about a thirtieth of an inch too long on account of the expansion of the tubes in place. An attempt was made to drive it in place with sledges, but without effect. In consequence of not being able to put in the second tube, the first one had to be taken out again and a more favorable opportunity waited for. On Monday morning the expansion was still greater, being five-eighths of an inch, and on Tuesday morning two inches and five-eighths, owing to the warmth of the day before. The prospect being that a delay of several days would occur before the exact temperature required would be obtained, it was determined to try a little strategy in the case by reducing the temperature artificially. About two o'clock yesterday morning forty-five tons of ice were applied to the tubes, and bound on by many yards of gunny bagging, which formed perhaps the most extensive ice poultice ever used. At three o'clock yesterday afternoon the expansion had been reduced about two inches, and it was calculated that at five o'clock this morning it would be sufficiently so to admit of the tubes being put in place."

The application of the ice proved entirely successful, and on the following day the connecting tubes were put in and the first arch completed.

Peoria, Pekin & Jacksonville.

A suit involving the validity of $20,000 of bonds issued to this company was recently tried in the Morgan County (Ill.) Circuit Court. The bonds in question were part of a subscription made by Morgan County to the Illinois River Railroad and were issued by the County Court to the Peoria, Pekin & Jacksonville Company in March, 1869. The court decides that the issue of the bonds was illegal, on account of the want of power on the part of the County Court to make the contract under which they were delivered. The Court also held that the railroad company receiving the bonds under this defective title must surrender them up; but he further held that these bonds did not belong to the county of Morgan, but were liable to be applied to the payment of the creditors of the Illinois River Railroad Company, and when surrendered under this decree to the county authorities must be held subject to that trust. It appears from the record in the case that the Peoria, Pekin & Jacksonville Railroad Company, or the men who own it, hold an outstanding judgment against the Illinois River Railroad Company, amounting to about $1,061,000, besides interest. A bill is to be filed at once by the holders of the judgment against the Illinois River Company intended to reach all the bonds, pursuant to this opinion.

South Side of Long Island.

Reports have lately been current that this company was seriously embarrassed. These reports, however, have been denied by the company. It is stated that the floating debt was largely increased by the late managers while they had control of the road.

Canada Southern.

All work on new construction and extensions of the road has been stopped for the present, owing to the embarrassment caused by the failure of the company's New York agents. All employees except those required to operate and maintain the completed road have been discharged.

Winchester & Alabama.

The extension of this road to a connection with the Memphis & Charleston is, it is said, to be built. The latter company has appropriated $900,000 in bonds to the Winchester & Alabama road, of which one-third is to be used in payment of the debt due to the State of Tennessee and the remainder to pay for the extension. The Winchester & Alabama road extends from Decherd, Tenn., on the Nashville, Chattanooga & St. Louis road, westward by a very circuitous route to Fayetteville, a distance of 37 miles. The extension will run from the Junction, 16 miles southeast of Fayetteville, southward to the Memphis & Charleston at Fearn's, near Huntsville, Ala., a distance of about 15 miles.

Marietta & Cincinnati.

The second track is about completed for ten miles, from Cincinnati to Norwood. Preparations are being made for a second track along the whole line, by widening and renewing bridges and grading at certain points.

It is probable that a branch will be constructed next year from Berlin, O., on the Portsmouth Branch, six miles from Hamden, southeast to an intersection with the Columbus, McArthur & Gallipolis (now under construction) about 10 miles north of Gallipolis. This branch will be about 14 miles long, and will probably be extended some 12 miles further, to the Ohio River near Middleport.

Pacific, of Missouri.

Arrangements are being made for the organization of a company to purchase the seven blocks which intervene between the company's depot in St. Louis and the river, and to lay the necessary tracks from the depot to the levee through the center of the blocks. The rest of the ground is to be used for the construction of extensive storage warehouses. This plan, if carried out, will settle finally the controversy about the present track in Poplar street, and will also provide much needed storage facilities.

Burlington, Cedar Rapids & Minnesota.

It is stated that the Muscatine Western road, which is leased by this company and operated as the Muscatine Division, is shortly to be extended westward from its present terminus to the Mahaska coal fields, a distance of about 70 miles. It is now completed from Muscatine, Ia., westward to the Iowa River, crossing the Burlington, Cedar Rapids & Minnesota at Nichols, 17 miles from Muscatine.

The first-mortgage bonds of the Burlington, Cedar Rapids & Minnesota Company have been admitted to the London Stock Exchange.

Milwaukee & St. Louis Air Line.

A committee of the Milwaukee Chamber of Commerce has made a report favorable to this projected road.

Toledo, Wabash & Western.

This company has purchased the property on the levee, between Maine and Jersey streets, in Quincy, Ill., as a site for its new passenger and freight depot. The track is being extended from the present depot southward to this property.

Atlantic & Great Western.

A meeting of the managers of this road, the Cleveland, Columbus, Cincinnati & Indianapolis and the Chicago & Atlantic, was held in Marion, Ohio, recently, to make arrangements for a union depot in that place, and also to prepare plans for working the three lines in harmony with each other.

Cairo & Vincennes.

Judge Baker, at Cairo, has refused to quash the injunction restraining Major Lee, the old Superintendent from interfering with the affairs of the road. A motion was made to dissolve the injunction, argument on which was postponed.

The Cairo, (Ill.) *Bulletin* says:

"General Burnside telegraphed to Superintendent Miller on Friday last that the change in the management of the road had been made in order that the employees might be paid regularly, and that payment to them would begin within a month. General Winslow, in a telegram to Major Lee asserts that General Burnside repeatedly refused to aid him to get money to pay off with, on account of his inability to do so; that all of the outside money to pay with had been raised by Winslow himself, and that he had arranged for more money to pay off, and would have done so but for the late action of the president, who has now assumed all responsibility. * * * The business of the road is increasing. During the summer months the road did very little business—did not earn half enough to pay the running expenses, which amount to probably between $15,000 and $20.000 a month; but during the last three weeks the income of the road has increased at the rate of about $1,000 a week. It will be seen that the new management took the road at a very opportune time, and if the increase of business indicated above continues another month the income of the road will be more than sufficient to pay the running expenses, and the employees will begin to receive their wages."

The City Council of Vincennes, Ind., has passed an ordinance granting the road right of way in that city alongside the track of the Indianapolis & Vincennes road.

Portland & Ogdensburg—Vermont Division.

Work on the grading from Swanton, Vt., southeastward has been commenced at Swanton. Some 400 men are to be at work shortly.

The offer of the Central Vermont Company to lease the road, has, it is said, been finally and decisively rejected.

Portland & Ogdensburg.

The engineers are at work locating the line from the Notch in the White Mountains to the Connecticut River. Some 300 men are at work on the grading from Upper Bartlett, N. H., westward through the Notch.

St. Paul & Pacific.

A dispatch from Amsterdam to Frankfort, dated August 28, says: St. Paul & Pacifics and St. Vincent & Brainerds are sinking again to their former low rates, since it has come to light that if the $5,000,000 10 per cent. loan is taken the former first-mortgage bonds sink into the position of shares, but if the loan is not placed, then the mortgages become worthless. Meanwhile considerable business was done in both kinds at the lower prices. It has not yet been made known what subscriptions have been made for that loan.

Peninsular.

The announcement of the consolidation of this company with the Port Huron & Lake Michigan caused the bonds of the company (on which there are several overdue coupons) to advance from about 30 to 40 in the Frankfort market.

New York & Oswego Midland.

On application of some of the creditors of this company, Judge Blatchford, of the United States Circuit Court in New York, appointed Abram S. Hewitt receiver of the company's effects, September 18. Mr. Hewitt gave the required security and at once took formal possession of the company's property. Mr. Hewitt is a director of the company, and is a man of large means, extensively engaged in the iron business. He is also a large creditor of the company.

A petition that the company be adjudged bankrupt was also filed by some holders of its paper, which has been protested. The court issued an order, returnable October 2, for the company to appear and show cause why the petition should not be granted.

The total bonded debt of the company is stated at $6,063,500, of which $5,240,000 is in first mortgage bonds, $683,500 second mortgage convertible bonds, and $140,000 second mortgage non-convertible bonds. The floating debt is stated to be about $2,000,000, about one half of which is over due and has mostly been protested.

Considerable opposition to the issue of town bonds has been developed in the towns along the Buffalo extension. Meetings in opposition to bonding have been held in several towns.

St. Paul & Pacific.

A dispatch to the St. Paul (Minn.) *Press*, under date of September 14, says:

"Negotiations for some time in progress have just been consummated in New York whereby the Brainerd Branch line of the St. Paul & Pacific has been purchased from the Northern Pacific Company by F. R. Delano, of St. Paul. The purchaser agrees to complete the unfinished portion of the road between Watab and Brainerd before December 1. The conditions of the purchase include an arrangement for close running connections on very favorable terms between the branch line and the Northern Pacific. The arrangement makes the branch line substantially a part of the Northern Pacific, though under independent management, and gives it all the business of the latter in the direction of the Mississippi River.

"Delano starts home immediately to commence work on the line."

This branch line extends from the St. Paul & Pacific at St. Anthony (10 miles from St. Paul) northwest 65 miles to St. Cloud, and thence northward 60 miles to Brainerd on the Northern Pacific. It is completed to Watab, 75 miles from St. Anthony, and the remaining 50 miles is all or nearly all graded.

The *Press* says: "The branch line of the St. Paul & Pacific, as far as Watab, is far less incumbered with debts than the main line. That portion of it between Watab and Brainerd, which belonged to the old St. Paul & Pacific, is, however, a part of the system which is incumbered with the heavy mortgage of fifteen million dollars, and must have been bought by Mr. Delano subject to this lien, unless some arrangement was made for lifting the lien from that particular section.

Buffalo, New York & Philadelphia.

This company has made a contract with the Cameron Coal Company to carry 50,000 tons of coal from Emporium to Buffalo. The production from the company's mine is now about 200 tons (20 car-loads) per day.

Atchison Bridge.

The contract for the earthwork of the approaches has been let to James McNeil, and work has already been commenced. Proposals are advertised for for furnishing 800 car-loads of stone for the abutments and piers of the bridge.

Dividends.

The regular quarterly dividend of 2½ per cent. on the stock of the United New Jersey Railroad & Canal Company will be paid October 10.

The Second Avenue (New York) Railroad Company will pay a dividend of $2 per share, October 10.

The New York, Providence & Boston Railroad Company has declared a dividend of 2½ per cent., payable October 1.

Northern Pacific—Pacific Division.

The bridge over the Nisqually River is completed and the track is laid seven miles beyond that stream. The grading is completed to a point four miles from Tacoma, where there is a very heavy cut, on which the whole grading force is now at work.

New Jersey Midland.

The line of the Belvidere Branch has been located from Belvidere, N. J., northwest to Newton, 23 miles. It is said that the road can be constructed with no grades over 15 feet to the mile. From Newton to the junction with the main line at Ogdensburg the location has not yet been made. Contracts for the right of way are now being made.

Pittsburgh, Washington & Baltimore.

This company has notified the city of Baltimore that it will be unable to pay the accruing interest on its second-mortgage bonds held by the city, and asks indulgence from the city. The second mortgage, of $5,000,000 in all, was created to fund the floating debt, to complete the road and place it in good condition and provide increased equipment. The cost of completing and repairing the road largely exceeded the estimates, and the floating debt is now $3,500,000, to meet which the company has

only $2,500,000 of second-mortgage bonds. The severe weather of last winter caused a large decrease in receipts, and also increased the cost of operating and maintaining the road.

Rio Grande.

About six miles of this road, which extends from Brownsville, Tex., northeast to Point Isabel, was recently washed away by a freshet, and the telegraphic reports state that nearly the whole line is submerged and badly damaged.

Illinois, Missouri & Texas.

The board of directors has given the contractors three months' more time to complete the road from Cape Girardeau, Mo., to the crossing of the Arkansas Branch of the St. Louis & Iron Mountain road.

It is reported that a large interest in the road has been sold to Mr. T. J. Peter and other parties connected with the Atchison, Topeka & Santa Fe Company.

Parker & Karns City.

This company is constructing a railroad of three-feet gauge from Parker City, Pa., on the Allegheny River, southwest through Martinsburg and Petrolia to Karns City, a distance of 10 miles. About four miles of the road is already graded. The road passes through the new oil district in Butler County, Pa.

New York, Norfolk & Charleston.

Pasquotank County, N. C., has voted to subscribe $40,000 to the capital stock of this company.

Des Moines Valley.

The time for the sale of this road under foreclosure has been fixed by the court. The sale will take place October 14.

Grand Trunk.

The work of changing the freight cars to standard gauge trucks was commenced September 22. The gauge of that part of the road between Stratford, Ont. (the junction of the Buffalo line), and Montreal will be changed from 5 feet 6 inches to 4 feet 8½ inches, on the 3d and 4th of October. The line west of Montreal will be run on the standard gauge October 6.

Canada Southern.

A special meeting of the stockholders was held in New York September 18. The President submitted a report on the condition of the company, which was received, but no action was taken, further consideration of the report being postponed to a future meeting.

Milwaukee & St. Paul.

The motion to dissolve the injunction restraining the company from building its bridge across Black River, near La Crosse, Wis., came up before the court at Sparta, Wis., September 13, and was adjourned to September 20.

The pontoon bridge over the Mississippi between Prairie du Chien, Wis., and McGregor, Ia., has been completed across the east channel and is now being carried across the west channel. The track is laid upon piles to the channel, which is, at this point, about 300 feet wide. Across the channel two pontoons are stretched, on which rails are laid, and an apron connects them with the track on the piling. The pontoons serve the purpose of a draw, being swung around out of the way when it is necessary to clear the channel.

Cairo & St. Louis.

The delay in completing this road is ascribed to the fact that the issue to the company of the bonds voted by Randolph, Monroe and Jackson counties, Ill., has been prevented by injunctions, and the company has consequently been unable to pay the contractors according to agreement. The amount of these bonds is $450,000. It is now proposed to issue second-mortgage bonds to the amount of the unpaid county and town subscriptions. It is said that money enough to complete the road can be obtained on these second-mortgage bonds.

Texas & Pacific.

On the line from Jefferson to Texarkana track is now laid to Atlanta, in Cass County, Tex., 31 miles northeast of Jefferson, and 15 miles further than at our last accounts.

On the Transcontinental Division track is laid from Sherman eastward 22 miles, and is within five miles of Bonham. The round-house and depot buildings at Sherman are completed.

The shops at Marshall are rapidly approaching completion, and the tools are being moved there from the old shops at Hallville.

The Red River is at low water, and construction material is now all shipped by rail from Galveston or St. Louis instead of by the river.

Michigan Lake Shore.

The Michigan Circuit Court at Allegan, Mich., has made an order discharging the Receiver appointed a short time since. This Receiver was Mr. Thomas Moesler, President of the company. The proceedings in the United States Circuit Court, commenced by the Cleveland, or Lake Shore party, will now probably be carried through and another Receiver appointed by that court.

Ware River.

The stock held by the town of Ware, Mass., has been sold at 55 cents on the dollar, the town losing $48,000 of its original investment.

Memphis & Little Rock.

In a letter to the Memphis papers, in answer to some charges made against him, Mr. Samuel Tate gives the following history of the proposed lease of the road to the Southern Railway Security Company, in connection with the lease of the Memphis and Charleston road: "In brief, the sale of the two-thirds of our interest (Greenlaw, Brinkley and myself) was agreed upon between Col. Scott and ourselves at cost and 7 per cent. interest, and a written contract entered into to lease to the Security Company the Memphis & Little Rock Railroad and Fort Smith Railroad, on the 11th of January, 1872, for 99 years, subject to the approval of their respective boards. It was signed by the presidents of each company, and, I was informed, approved informally by the Security Company's board, before Mr. Cass (the then President) signed it. It was fully approved by the other parties. In the meantime the lease of the Memphis & Charleston Railroad was made and approved. The board of directors of the Southern Security Company afterward rejected the lease of the Memphis & Little Rock Railroad, and the sale agreed upon was not consummated.

"I afterwards offered Mr. Scott two-thirds of our interest in the stock of the company at cost, and to pool our interest with his, thereby offering full control of the company for about $160,000, all of which was rejected by Scott's board. The Louisville & Nashville Railroad Company was made the same offer, which they rejected, but agreed with the Security Company that they would not bid for the road, except jointly with them.

"We have always been willing, and offered to the Louisville Company or the Security Company the control of the road on almost their own terms, or anything short of actual ruin to us, the details of which offers, and the proof incontrovertible, we will produce to any one desiring it. * * * * The agreement made with Mr. Scott, before the lease of the Memphis & Charleston Railroad, to purchase two-thirds of our interest in the Memphis & Little Rock Railroad Company was coupled with an offer by a member of his company to give Mr. Greenlaw and myself an interest in the lease of the Memphis & Charleston Railroad, thereby securing our full co-operation in consolidating the two roads, leaving us one-third interest in one-half of the Memphis & Little Rock and one-fourth of the Memphis & Charleston Railroad lease, which we agreed to, believing it would result in forming a great thoroughfare from Bristol to Shreveport, through Memphis. We had spent a large amount of money on the Memphis & Little Rock road, and desired to get it back if possible; and this arrangement promised to give us back two-thirds of it, and leave the other third invested in a consolidation we believed would be a success to ourselves finally, and of incalculable benefit to Memphis.

"I had no connection with the Memphis & Charleston Railroad, and had as much right to lease it, or take an interest in its lease, as Tom Scott or any one else, and I believed the lease to be to the best interest of the Memphis & Charleston Railroad stockholders. Mr. Greenlaw and myself contracted to purchase $400,000 of stock in that company (to effect the lease) at forty cents, intending and believing ourselves able to make the purchase and hold the stock as an investment, which we would have been if our sale of two-thirds interest in the Little Rock Railroad had been carried out as agreed upon; but it was not, and we were thereby unable to pay for it, and had to make heavy sacrifices to get rid of the balance. The sacrifices that we have been compelled to make resulted in our parting with our interest in the lease, and we are left alone with the Memphis & Little Rock Railroad."

Greenville & Columbia.

Under a resolution of the board of directors, the interest coupons of the bonds guaranteed by the State, and of such other bonds as are recorded in the company's office, which matured between January 1, 1872, and July 1, 1873, both inclusive, will be funded in bonds having ten years to run, as provided for in the proposals made to the bondholders August 1, 1873. The holders of these coupons are requested to send a statement of them to the company's office at Columbia, S. C., to facilitate the exchange and to enable the necessary arrangements to be made for the resumption of regular interest payments January 1, 1874.

Bridgeton & Port Norris.

This road is to be extended from the present terminus at Port Norris, N. J., southward about three miles to the mouth of the Maurice River.

Burlington & Missouri River in Nebraska.

The land sales of this company for the eight months ending August 31, 1873, amounted to $817,790.31. The heaviest sales were in June, when they reached $273,065.73, and the lightest in February, when the amount was $20,034.94. Sales previous to the present year amounted to $2,482,547.76, making the whole amount up to the end of August, $3,300,338.07. The average price is about $8 per acre. The company has received patents for 2,465,000 acres. The sales already amount to nearly one-half of the bonded debt.

Juniata & State Line.

A new line has been surveyed for this road, which is to run from Philadelphia southwest to the Maryland line near Oxford, whence it will be continued to Baltimore by the Maryland & Pennsylvania road, now under construction. The new line leaves the Westchester & Philadelphia road near Street Road station and runs southwest to the Brandywine at Painters' Bridge and thence in a nearly straight line by way of Pocopson Bridge and Unionville to Oxford.

Davenport & St. Paul.

A large number of the business men of Davenport, Ia., have petitioned the City Council to allow this company to lay its track into the city temporarily and use it under certain restrictions, pending the trial of the suit between the city and the company.

Dakota Southern.

A motion has been made on behalf of the company to dissolve the injunction recently obtained to restrain the issue of bonds. The argument on the case was postponed.

Montpelier & Wells River.

Trains have commenced to run regularly from Montpelier, Vt., east to Plainfield, 10 miles. The work of tracklaying is proceeding steadily, and the road will be completed by the middle of October.

Kalamazoo, Lowell & Northern Michigan.

The line of this road is now located from Kalamazoo, Mich., northeast to Hastings, and the engineers are now locating it from Hastings north to Lowell.

Washington, Cincinnati & St. Louis.

Highland County, West Va., has subscribed $70,000 to the stock of this company, and Pocahontas and Webster counties will shortly vote on the question of subscribing $50,000 each.

Iowa Southwestern.

It is stated that work will shortly be resumed on this road, and that the section from Iowa City, Ia., northeast to a junction with the Burlington, Cedar Rapids & Minnesota (about seven miles) will be completed and opened at once.

Minneapolis, Rochester & La Crescent.

It is proposed to build a narrow-gauge road from Minneapolis, Minn., southeast to Rochester, and thence east by south to the Mississippi at La Crescent. The line would be about 140 miles long.

St. Paul, Stillwater & Taylor's Falls.

Surveys are being made for a short branch line or connection between this road and the Stillwater Branch of the Lake Superior & Mississippi, back of Stillwater, Minn.

Mississippi River Improvements.

Portions of the report of Colonel Simpson, the engineer officer in charge of the improvements of the Mississippi from the mouth of the Illinois to the mouth of the Ohio, for the year ending June 30, 1873, have been published. Colonel Simpson calls attention to the fact that no systematic survey of the river has ever been made. A large amount of information has been collected at certain points from time to time, but it has never been collected or arranged for reference. The making of a complete survey is recommended.

The work under Colonel Simpson's charge is divided into three sections. On the first section, from the mouth of the Illinois to the mouth of the Missouri, the chief work has been the dam at Ellis Island, which has been nearly completed and on which about $20,000 has been expended. An extension of the dam to close the passage between Ellis and Round islands is recommended, which, however, would close the only practicable channel for the ferry across the river from Alton, and would make necessary the building of a causeway from Ellis Island to the Missouri shore.

On the second section, from the Missouri to the Meramec, which includes St. Louis Harbor, the main work was the dyke at Sawyer's Bend, of which 1,475 feet was completed and 1,450 feet undertaken by the St. Louis Commissioners, leaving 7,635 feet to be provided for. Of this dyke, the report says:

"Before an examination of the locality, it had been proposed to protect the banks by a system of spur dykes below low water, and a continuous revetment of the slope above. As that system still has its advocates, it may be well to state the grounds for the preference of a longitudinal dyke as a foundation for the revetment.

"The spur dykes as proposed were to be 150 feet apart, 50 feet in length and 6 feet high, each spur being expected to protect three times its length; an expectation founded on experience, but not considering that these dykes would be submerged and therefore very unlike jetties, where the current sweeps around the end, but does not run over.

"In the case of the submerged weirs, the action of the eddy below is well known to be sufficient to require an extension of the abutments down stream, and this is a similar case.

"Another fallacy in the theory of spur dykes, as suggested for this locality, is apparent in consideration of the effective length, which is a horizontal line; therefore if the dyke be of uniform height, resting on a slope, the expression for the effective length would be effective L = h-sine slope, or wholly independent of the length of dyke, which only can enter as a limitation when sine slope becomes very small, showing that the theory is only applicable in level bottom.

"The underwater slope at Sawyer's bend was found to be almost 2 horizontal to 1 perpendicular until a depth of 18 feet was reached, when it became entirely level, consequently the spur dykes, aside from the first objecti n, would have to be at least 18 feet high at the outer end to make their effective length answer the conditions, and in that case the cost would exceed that of the longitudinal dykes adopted.

"The plan adopted was to excavate where necessary a trench to the depth of eight feet below lowest water and fill it with brush in crossed courses, the tops reaching outward as far as practicable, to form a mat to protect the base from scour; on the brush rip-rap is placed until it appears at mean low water, which was assumed at 5 4-10 feet above lowest low water, the rip-rap forming the base of the revetted slope.

"After the discussion of various slopes, that of two horizontal to one perpendicular was adopted, chiefly as that furnished material for the grading better than any other.

"The detail of the plan is the same as for the wings of the abutment at the Alton dam."

On the third section from the Meramec to the Ohio, surveys were made for the projected improvements at Horsetail Bar, and plans prepared for the improvements at that point. The plans involve the construction of four settees for the construction of the water-way and a dam to close Carroll's Island slough.

An additional feature is proposed to be introduced in the construction of dams where needed, viz.: The use of brush rafts or matiresses.

The reports states that $600,000 can be profitably expended on the work during the current year, and recommends the purchase of a steamer with the necessary equipment for the work.

New Haven, Middletown & Willimantic.

A correspondent of the Philadelphia *Railroad and Mining Register* describes this road, which has just been completed after being under construction for years, as follows:

"From New Haven the Air Line Railroad is nearly straight for 23½ miles to Middletown, and runs over the level and well-cultivated delta of the Connecticut.

"Crossing the river by a noble one-track wrought-iron Phœnix bridge, the next division, 28 miles long to Willimantic, crosses a set of red shale terraces belonging to the ancient river bed, in an east course and with gently ascending gradients one mile; then curves to the southeast and south-southeast, still ascending through red sandstone rock-cuts and short, deep fills, for two miles, with the river in full view, until it rounds a set of knobs facing south, and resumes its east and northeast course.

"Hence to Willimantic the location was difficult, one-fourth, perhaps one-third of the distance being curvature, but none of the curves over five degs., and the highest gradient 62 feet to the mile.

"The country rock is gneiss and metamorphic shale, covered with a variable thickness of drift sand and boulders. Most of the numerous cuts are in this soft material, and to avoid going down into the rock, curves were located which did not furnish enough stuff for the embankments. A good deal of borrowing has been done, and numerous trestle works attest the lack of material. Some of these are on one side of the little valley, others stand upon low embankments; everything looking half finished and preparatory.

"But there are a good many rock cuts, one of which is said to have a maximum depth of 60 feet, although we saw none that looked it.

"About midway there is a series of wood and iron trestles of unusual magnitude and proximity to one another. Certainly a full mile of the road is thus supported. It reminds one of the Huntingdon & Broad Top and the Catawissa roads. An iron viaduct (something like that leading to the Balliot mine from the Lehigh River) is 1,000 feet long and 140 feet high; another 1,800 feet long and 60 feet high.

"These are airy structures, but firm as stone bridges, and wide enough for a second track. But the cuts and fills are all made for but one track, and must therefore be widened. Those which face the Salmon River have already slipped badly and irregularly curved the track, so as to require slow running. All this will be remedied in the next two or three years.

"The cause of the unsual engineering difficulties on this division is evident enough. The line is here ascending to the plain of Eastern Connecticut, along its southern border. The drainage is not west towards the Connecticut (as on the Boston & Albany line), but south toward Long Island Sound. The primary rocks also lie nearly flat, and what dip they have is towards the west and north. Consequently, the streams escape southward in numerous deep and narrow vales, across all which the railroad must make its way by heavy embankments, with rock cuts in the narrow, sharp dividing ridges or spurs.

"After passing a broad divide, the west branch of the river Thames is reached, about a mile above Willimantic, and the road runs down to the village alongside of the New London Northern.

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"The New Haven-Willimantic Air Line section of this through route is controlled by three or four men who have not yet come to terms with the State of Massachusetts and other owners of the Boston, Hartford & Erie. Some bargain between the parties is inevitable, for the prosperity of both sections of the through route depends upon one. Nor do the parties interested intend to be in anywise dependent upon the New York & New Haven Railroad Company. They have a short cut from New Haven to Boston 23 miles nearer than the Shore Line route, and they are contracting for a ten-million-dollar road to run parallel with the New Haven road, and located a few miles further in from the shore of the Sound, thus requiring only two drawbridges, and giving service to the back towns. This location of the line is said to save another seven miles."

Fort Worth & Denver City.

This road, chartered by the Legislature of the State of Texas, is to run in a northwesterly direction from Fort Worth, Texas, through the pan-handle of Texas to Denver, Colorado, a distance of about 685 miles. An officer of the company writes to us as follows concerning its resources: "It passes through the most fertile portion of Texas, and, being endowed with a liberal land grant, the opening of the line will place upon the market some of the best farming and grazing lands of the Southwest. An engineering party now in the field report the existence of rich copper and coal deposits, found on the surveyed line, and an assay of the copper having been made by the company proves it to be one of the best deposits of copper known in the country, and will, upon being developed, prove a successful rival to the well-known copper mines of Michigan and the far North. The coal is found in abundance, is a very hard bituminous, free from sulphur, and has been found to be, upon a severe test, adapted to nearly all uses where coal has been found necessary."